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# **Exhibit**

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**UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA  
SAN FRANCISCO DIVISION**

**IN RE GOOGLE PLAY STORE  
ANTITRUST LITIGATION**

THIS DOCUMENT RELATES TO:

*In re Google Play Consumer Antitrust  
Litigation*, Case No. 3:20-cv-05761-JD

*State of Utah et al. v. Google LLC et al.*, Case  
No. 3:21-cv-05227-JD

No. 3:21-md-02981-JD

**MERITS REPLY REPORT OF**

**HAL J. SINGER, PH.D.**

Judge: Hon. James Donato

PARTY AND NON-PARTY HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY

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## INTRODUCTION AND SUMMARY OF CONCLUSIONS

1. I have been asked by counsel for Consumer Plaintiffs to respond to the expert reports of Drs. Gregory Leonard,<sup>1</sup> Matthew Gentzkow,<sup>2</sup> Catherine Tucker,<sup>3</sup> and Douglas Skinner<sup>4</sup> (collectively, the “Google Experts”). As detailed below, having carefully considered the reports of the Google Experts, I am not inclined to materially alter the opinions expressed in my report on the merits of this case (“Merits Report”), or those in my prior class certification reports.<sup>5</sup>

## QUALIFICATIONS

2. My qualifications are provided in my prior reports.

### I. DR. LEONARD FAILS TO UNDERMINE MY CONCLUSIONS

3. Below I explain why Dr. Leonard’s critiques of my analysis do not undermine my conclusions. As a preliminary matter, I note that Dr. Leonard and other Google economists claim that modeling a competitive but-for world in this case requires a degree of specificity that would be impractical or impossible to satisfy in any antitrust case.<sup>6</sup> None of the Google economists explain what economic models might possibly satisfy the conditions that they articulate or the data

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1. Expert Report of Dr. Gregory K. Leonard (November 18, 2022) [hereafter, Leonard Report].

2. Expert Report of Matthew Gentzkow (November 18, 2022) [hereafter, Gentzkow Report].

3. Expert Report of Catherine E. Tucker (November 18, 2022) [hereafter, Tucker Report].

4. Expert Report of Douglas J. Skinner (November 18, 2022) [hereafter, Skinner Report].

5. Merits Report of Hal J. Singer, Ph.D. (October 3, 2022) [hereafter, Singer Merits Report]. Unless otherwise defined, capitalized terms herein are defined the same as they are in the Singer Merits Report, and in my class certification reports. *See* Class Certification Report of Hal J. Singer, PhD (February 28, 2022) [hereafter, “Singer Class Cert Report”]; *see also* Class Certification Reply Report of Hal J. Singer, PhD (April 25, 2022) [hereafter, “Singer Class Cert Reply”]; *see also* Class Certification Reply Report of Hal J. Singer, PhD (Errata) (May 10, 2022) [hereafter, “Singer Class Cert Reply Errata”]. The materials I relied upon in forming my opinions are noted in the footnotes throughout this report or otherwise listed in Appendix 1, or in my prior reports. I reserve the right to supplement, expand, or amend my opinions. All of my economic models use Play Store transaction data produced by Google (“Google Transactional Data”). The Google Transactional Data includes billions of records, and was produced in two batches. The first batch (GOOG-PLAY-007203251) was produced on July 27, 2021, and includes U.S. transactions from November 2010 through July 3, 2021. The second batch was produced on August 17, 2022, and includes U.S. transactions between July 4, 2021 through May 31, 2022. As of the filing date of my Merits Report (October 3, 2022), portions of the second batch had not been fully incorporated into my analysis due to the substantial computational burden of processing and analyzing billions of records. On October 19, 2022, I produced an amended version of my Merits Report reflecting the fully processed transaction data. This update did not materially alter my conclusions.

6. Leonard Report ¶¶27-29 (“Specifying the but-for world is a complex undertaking...In this case, the important aspects of the but-for world that are relevant for Plaintiffs’ experts damages calculations, but that they either did not address at all or did not address clearly include (1) what app stores or types of app stores would have entered, when would they have entered, what devices would they be on, and which apps would have been available in those stores; (2) how Google would have changed its level of investment in Android, Google Play and app developer support; (3) if, how, and why Google would have changed its monetization strategy; (4) how consumers would have been affected by the existence of additional app stores (e.g., greater search costs or increased malware on Android devices); (5) how developers would have been affected by the existence of additional app stores and/or multiple Android-based OSs (e.g., greater distribution costs required with multiple stores or multiple OSs); (6) to the extent there is a claim that there would have been additional apps in the but-for world, the identity, attributes, and quality of those apps; and so on.”). *See also* Gentzkow Report ¶636.

that would be required to implement them, because such models do not exist, and the data requirements would likely be impossible to satisfy in any event.

**A. Dr. Leonard Fails to Undermine the Standard Economics and Rigorous Empirical Analysis That I Use to Establish Pass-Through**

4. In my Merits Report, I explained why, as a matter of standard economic principles, profit-maximizing firms engage in pass-through: When their costs increase, firms have a clear economic incentive to charge higher prices; conversely, when costs decrease, the incentive is to reduce prices to increase volume of sales, thus maximizing profit.<sup>7</sup> The “pass-through rate” gives the change in a firm’s profit-maximizing price resulting from a given change in marginal cost.<sup>8</sup> To assess the pass-through rate in this case, I applied standard economic models and standard econometric methods to Google’s voluminous transaction data.

5. I have previously explained why Google’s limited take rate reductions in the actual world do not provide a reliable basis for estimating the market-wide pass-through that would have occurred in a more competitive but-for world.<sup>9</sup> Nevertheless, Dr. Leonard attempts to estimate pass-through using flawed, SKU-level comparisons similar to those employed by Google’s class certification expert (Dr. Burtis).<sup>10</sup> I explain why Dr. Leonard’s analysis is flawed and unreliable in Part I.A.4 below.

6. Instead of Dr. Leonard’s unreliable approach to estimating pass-through, I used standard econometric methods to measure the shape of the demand curve facing app developers, which determines the pass-through rate, and concluded that the standard logit model fits the data well.<sup>11</sup> Dr. Leonard claims that “today it is uncommon for an empirical economics research study to use this [logit] model.”<sup>12</sup> Dr. Leonard is wrong. My Merits Report cites published, peer-

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7. Singer Merits Report Parts VI.D.1-2.

8. For example, if a firm’s costs increase by \$10 per unit, and the firm responds by raising its price by \$5, the pass-through rate is  $\$5/\$10 = 50$  percent. Dr. Leonard agrees with this definition. Leonard Report ¶30.

9. In a more competitive but-for world, all or almost all developers would enjoy substantially and permanently lower take rates. *See, e.g.*, Singer Class Reply ¶10. In contrast, Google’s take rate reductions have been generally limited to narrowly defined SKUs comprising a small share of developer revenue, and/or short time horizons, making it unlikely that any change take rates would have had a material effect on developer finances or pricing. *See, e.g.*, Singer Class Reply ¶103; ¶126. In addition, Google’s 2018 reduction in subscription take rates applied only to users that had maintained their subscriptions for at least one year. If a consumer has subscribed to a product for a year (or more) and paid the same monthly price, that consumer has revealed a strong willingness to pay for the subscription offering, and it would make little economic sense for a developer to target price cuts to its least price-sensitive customers. *Id.* at ¶119. Moreover, the pricing rules in the Play Store’s developer interface likely made it difficult or impossible for most developers to drop prices to subscribers after the first year, even if they had wanted to do so. *Id.* at ¶122. In addition, developers would be incentivized to pass on savings from a lower take rate via steering and discounting, to induce consumers to switch to the low-cost provider. These incentives are absent in the actual world. Developers that enjoyed Google’s limited take-rate decreases in the actual world did not have to share any of the savings with their customers in order to realize the cost savings. Singer Merits Report ¶369.

10. Singer Class Reply ¶¶123-133.

11. Singer Merits Report Part VI.D.3.

12. Leonard Report ¶72. Dr. Leonard claims that the logit model is “highly restrictive.” *Id.* In fact, economists recognize that “the logit model is the ideal rather than a restriction.” Kenneth Train, *Logit, in DISCRETE CHOICE METHODS WITH SIMULATION*, 36 (Cambridge University Press 2009).

reviewed research demonstrating otherwise.<sup>13</sup> Among many other things, I cite to a peer-reviewed 2018 article authored by academics and DOJ economists explaining that logit is one of the primary models included in the antitrust software package developed by DOJ economists.<sup>14</sup> This article and others that I cite were published more recently than all the papers that Dr. Leonard relies upon to support his incorrect claim, most of which were published in the 1980s or 1990s.<sup>15</sup>

7. Dr. Leonard does not dispute that the standard logit demand systems that I used to calculate pass-through explain over 95 percent of the variation in consumer demand in the voluminous Google transaction data.<sup>16</sup> Nor does he dispute that, consistent with economic expectations, the logit regression results confirm a negative and highly statistically significant relationship between demand and price.<sup>17</sup> Instead, Dr. Leonard claims erroneously that I did not provide sufficient empirical justification for the standard logit demand systems that I employ here.<sup>18</sup> I follow standard practice in empirical antitrust work, in which the form of the demand curve is assessed based on “how well the model fits the observable data.”<sup>19</sup>

8. In my Merits Report, I also provided corroborative empirical evidence of pass-through by demonstrating that higher tax rates (which as I discuss below are economically analogous to higher take rates) are systematically passed on by developers to consumers in the form of higher prices.<sup>20</sup> The combination of standard economic principles and my empirical analysis allowed me to conclude that lower take rates would have resulted in lower prices for consumers in a more competitive but-for world and to quantify the resulting overcharge for purposes of determining impact and calculating damages to consumers in the United States who purchased Apps or In-App Content.<sup>21</sup>

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13. Singer Merits Report ¶348, n. 809; ¶356, n. 835.

14. Singer Merits Report ¶348, n. 809, citing Luke Froeb et al., *Economics at the Antitrust Division: 2017–2018*, 53 REVIEW OF INDUSTRIAL ORGANIZATION 637, 639–642 (2018).

15. Leonard Report ¶72, n. 76. Dr. Leonard relies upon papers that advocate “random coefficient” logit models (or “mixed logit” models), which are sometimes used by academics, but seldom by antitrust practitioners. As I explained in my Merits Report, in practice, these techniques suffer from well-documented computational problems, which can severely limit their applicability and accuracy when applied to real-world data sets. Singer Merits Report ¶348, n. 810.

16. Singer Merits Report ¶354.

17. *Id.*

18. Leonard Report ¶¶68–72.

19. Luke Froeb et. al., *Economics at the Antitrust Division: 2017–2018*, 53 REVIEW OF INDUSTRIAL ORGANIZATION 637, 640 (2018). The approach I adopt is more rigorous than assuming that the demand curve has a standard form (such as logit) and then calibrating the demand system to the data based on that assumption. *See, e.g.*, Nathan Miller, Marc Remer, & Gloria Sheu, *Using cost pass-through to calibrate demand*, 118 ECONOMICS LETTERS 451 (2013) (“Researchers in industrial economics frequently conduct counter-factual experiments based on parameterized systems of consumer demand. *The functional form of demand is assumed* and the structural parameters are either estimated from data or calibrated.”) (emphasis added). *See also* Froeb et. al. (2018), *supra*, at 640–643. As shown in Appendix 3, linear demand does not fit the data well. Contrary to economics, the price coefficients are statistically insignificant in 12 out of the 33 regressions. By contrast, the price coefficients are statistically significant for each and every app category for the logit model. Singer Merits Report Table 12.

20. Singer Merits Report Part VI.D.4.b.

21. In my Merits Report, I demonstrated empirically that my damages models can accommodate focal-point pricing, and that at most a *de minimis* share of apps would not lower price due to focal-point pricing in the but-for

# 1. Dr. Leonard Baselessly Rejects Standard Economic Methods Deriving Pass-Through From a Market-Wide Change in Costs

9. In a more competitive but-for world, all or almost all developers would benefit from substantially and permanently lower costs, owing to substantially and permanently lower take rates. Accordingly, in my Merits Report, I estimated the pass-through rate by applying standard economic calculations of market-wide cost-pass-through.<sup>22</sup> These calculations solve for each developer's profit-maximizing price decrease to consumers, given what other developers are charging in light of lower market-wide costs.<sup>23</sup> This provides the correct pass-through rate—namely, the extent to which prices for App and In-App Content would decline in the but-for world, given the market-wide decrease in cost that would occur, pushing the market to a new, more competitive equilibrium. Consistent with standard practice, I calculated the change in equilibrium prices resulting from a lower take rate by multiplying (1) the decrease in cost resulting from a lower take rate by (2) the pass-through rate.<sup>24</sup>

10. Without citation to any authority, Dr. Leonard erroneously claims that the “correct way” to solve for the pass-through rate “is to ask the question, ‘[H]ow the service fee *rate* change would affect the profit maximizing price?’”<sup>25</sup> In making this unsupported claim, Dr. Leonard ignores the elementary economic fact that developers adjust their prices based on changes in their actual costs (in dollars), not in the “service fee rate” per se (which is not a dollar amount). Dr. Leonard's calculations in Appendix D of his report proceed from this flawed premise<sup>26</sup> despite the fact that what matters for pass-through is the change in costs resulting from a change in the take rate, which is what I have calculated.<sup>27</sup>

11. Dr. Leonard's error is compounded by the fact that his calculations do not account for the market-wide nature of the cost decrease that would occur in a more competitive but-for world; Dr. Leonard's calculations in Appendix D of his report are limited to how a single developer reacts to a change in its own take rate. In other words, Dr. Leonard's calculations in Appendix D

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world. Singer Merits Report ¶¶408-413. Dr. Leonard ignores this quantitative analysis. Leonard Report ¶31, n. 5. Dr. Leonard claims incorrectly that the lack of steering in the actual world contributes to focal-point pricing. Leonard Report ¶32, n. 7. In fact, developers in the but-for world would have economic incentives to depart from focal-point pricing in increments of \$1; moreover, in the few episodes where we do observe steering in the actual world, developers have been observed to deviate from \$1 pricing increments. Singer Merits Report ¶405. In addition, Apple recently announced new price points in App Store. In addition to allowing ten-cent intervals, Apple also lowered its minimum price from \$0.99 to \$0.29. This provides additional evidence that focal-point pricing in \$1 increments is far from economically inevitable. *See Apple, Apple announces biggest upgrade to App Store pricing, adding 700 new price points* (Dec. 6, 2022), <https://www.apple.com/newsroom/2022/12/apple-announces-biggest-upgrade-to-app-store-pricing-adding-700-new-price-points/>.

22. Singer Merits Report ¶¶358-360.

23. Singer Merits Report ¶¶358-360; ¶337, n. 795.

24. Singer Merits Report ¶363; ¶337 n. 795.

25. Leonard Report Appendix D, ¶2 (emphasis in original).

26. Leonard Report Appendix D, ¶2 (“That is, the correct calculation would be based on  $\partial P/\partial t$ , where  $P$  is the app price set by an app developer and  $t$  is the service fee rate.”)

27. Singer Merits Report ¶363; ¶337 n. 795.

do not account for the fact that developers would decrease their prices in response to other developers' price cuts.<sup>28</sup>

12. Despite the voluminous empirical econometric literature on pass-through, Dr. Leonard does not (and cannot) cite to a single instance of his formula ever being used in a peer-reviewed research article (or anywhere else) for any purpose, let alone to calculate pass-through.

## **2. Dr. Leonard Baselessly Rejects Standard Econometric Methods Demonstrating Developer Pass-Through of *Ad Valorem* Sales Taxes**

13. In Table 15 of my Merits Report, I applied standard regression methods to Google's transaction data to demonstrate empirically that developers systematically pass on higher tax rates imposed by state or local authorities (that is, higher *ad valorem* costs) in the form of higher prices paid by Consumer Plaintiffs.<sup>29</sup> Dr. Leonard mistakenly claims that these regressions are "mathematically guaranteed" to show 100 percent pass-through.<sup>30</sup> To support this claim, Dr. Leonard misleadingly focuses on one of the regressions (column (1) of Table 15 of my Merits Report).<sup>31</sup> Dr. Leonard conveniently ignores the very next column of Table 15, which shows pass-through less than 100 percent: According to column (2) of Table 15, a one percentage-point increase in the sales tax rate leads to a 0.7 percent increase in the post-tax price. To illustrate, suppose that the post-tax price of an App is initially \$2.00, and that the tax rate is five percent, so that the pre-tax price is  $\$2.00/(1.05) = \$1.90$ . If the tax rate increases by five percentage points (to ten percent), the post-tax price will increase by  $[0.7 \text{ percent} \times 5] = 3.5 \text{ percent}$ , resulting in a new post-tax price of  $[\$2.00 \times 1.035] = \$2.07$ . The new pre-tax price will be  $\$2.07/1.10 = \$1.88$ . The pass-through rate in this example is 75 percent (equal to the change in the post-tax price divided by the change in the tax amount, or  $[\$2.07 - \$2.00]/[(\$2.07 - \$1.88) - (\$2.00 - \$1.90)]$ ). The pass-through rate is below 100 percent because the developer decreases its pre-tax price in response to an increase in the tax rate.

14. Dr. Leonard claims my regressions in Table 15 do not measure pass-through because developers lack the "ability to adjust pre-tax prices in response to tax rate variation as a way to absorb taxes."<sup>32</sup> This is incorrect; developers are free to adjust the pre-tax price in response to anything they choose, including sales taxes. More fundamentally, Dr. Leonard ignores the elementary economic principle that, when a tax is levied on a product or service, the pass-through rate determines the extent to which a consumer bears the cost of the tax; this is true regardless of whether the tax is levied on the firm or on the consumer.<sup>33</sup> Therefore, the extent to which the

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28. Leonard Report Appendix D, ¶¶5-6 (Equations (A.2) - (A.9) are solved individually, instead of on a marketwide basis).

29. Singer Merits Report ¶368.

30. Leonard Report ¶82.

31. Leonard Report ¶82.

32. Leonard Report ¶81.

33. Singer Merits Report ¶367, citing N. GREGORY MANKIW, PRINCIPLES OF MICROECONOMICS 120-127 (Cengage Learning 8th ed. 2018) [hereafter, MANKIW]. MANKIW at 123 ("*Taxes levied on sellers and taxes levied on buyers are equivalent*). In both cases, the tax places a wedge between the price that buyers pay and the price that sellers receive. The wedge between the buyers' price and the sellers' price is the same, regardless of whether the tax is levied on buyers or sellers...The only difference between a tax levied on sellers and a tax levied on buyers is who sends the



before-tax price does or does not adjust in response to a change in the tax rate is directly informative of the pass-through rate. The regressions in Table 15 of my Merits Report are grounded in these standard principles.

15. Dr. Leonard claims that “Google’s system does not allow developers to systematically set different pre-tax prices for different states in the US,” but my regressions do not rely on “tax variation across states.”<sup>34</sup> Dr. Leonard ignores that my regressions control for state fixed effects.<sup>35</sup> The inclusion of state fixed effects means that my regressions do not measure pass-through by comparing tax rates and prices across different states, as Dr. Leonard mistakenly suggests.<sup>36</sup>

### 3. Dr. Leonard Baselessly Rejects Standard Economic Principles of Pass-Through

16. In the past in his own published work, Dr. Leonard has acknowledged the standard economic principle that firms charge higher prices when their costs are higher and lower prices when costs are lower. He has written: “Economic theory makes a straightforward prediction: The decrease in cost will lead to a decrease in price, with the relationship between the decreases in cost and price depending on the shape of the demand curve.”<sup>37</sup> As Dr. Leonard makes clear in his article, these fundamental conclusions regarding pass-through are not just abstract theoretical results; they apply directly to real-world economic outcomes.<sup>38</sup> Yet Dr. Leonard critiques me for estimating pass-through based on the shape of the demand curve in this case.<sup>39</sup>

17. In contrast, in his expert report, Dr. Leonard distances his opinions from these fundamental economic principles. Dr. Leonard claims baselessly that pass-through could be “negative” in the context of App pricing. In other words, Dr. Leonard speculates that developers

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money to the government.”) (emphasis in original). Dr. Leonard ignores this basic principle when he claims that my regression is “uninformative about the pass-through of service fees,” because “while the service fees are levied directly on the developers, sales taxes are levied directly on consumers.” Leonard Report ¶81.

34. Leonard Report ¶81.

35. Singer Merits Report ¶368, Table 15 (“Fixed effects in column (2) are unique to App name, App subproduct, purchase type (App sale, In-App purchase, subscription), *customer state*, App category, and year. Fixed effects in column (1) are the same, except that they are not year-specific.”) (emphasis added).

36. In Appendix 4, I demonstrate this point further by collapsing the data used in Table 15 down to the nationwide level; the regression results continue to show a positive and highly statistically significant relationship between the tax rate and the price.

37. Jerry Hausman & Greg Leonard, *Efficiencies from the Consumer Viewpoint*, 17(3) GEORGE MASON LAW REVIEW 707, 708 (1999) [hereafter Hausman & Leonard] (“What would be the effect on prices to consumers from the cost reduction? Economic theory makes a straightforward prediction: The decrease in cost will lead to a decrease in price, with the relationship between the decreases in cost and price depending on the shape of the demand curve.”).

38. *Id.* (“[W]e have been continually surprised over the years that many lawyers at the antitrust agencies refuse to accept this proposition and instead claim that a monopolist will ‘pocket the cost savings’ and not pass any of them on to consumers. This claim is based on the incorrect assertion that only competition forces a firm to pass along cost savings. In fact, however, profit maximization by the firm causes it to pass along at least some of the cost savings in terms of a lower price, even if the firm is a monopolist.”).

39. Dr. Leonard now claims that the analysis in Hausman & Leonard, *supra*, was limited to “discussing per unit marginal cost instead of the pertinent *ad valorem* cost.” Leonard Report ¶63. In fact, any change in costs resulting from a lower take rate can be expressed equivalently as a change in per-unit costs. Singer Merits Report ¶363; ¶337 n. 795.

would *increase* their prices to the Consumer Class as a result of a *decrease* in their costs.<sup>40</sup> In a failed attempt to support this novel claim, Dr. Leonard offers a single, purely hypothetical example that does not make economic sense:

Suppose a developer monetizes through both paid content and advertising. Following a service fee rate reduction, the developer may find it more profitable to increase the price (hence making more profit per sale) and lower the intensity of advertising (hence forgoing advertising revenue but at the same time limiting the reduction in consumer demand due to consumers' preference for less advertising). The more consumers value the app and the more consumers dislike advertising, the more appealing this change in pricing strategy may be for the developer. This would lead to a negative pass-through.<sup>41</sup>

18. Dr. Leonard's hypothetical contradicts elementary economics because it assumes nonsensically that developers would not initially maximize profit with respect to their advertising decisions, but would only belatedly decide to begin maximizing profit after the take rate falls. If the developer in this hypothetical were economically rational, it would set advertising intensity to maximize profit before the decline in the take rate. When the take rate declines, this would have no effect on the on the intensity of advertising that consumers are willing to tolerate. Therefore, Dr. Leonard's speculation that the developer would lower the advertising intensity and raise the price in response to a decrease in the take rate does not make economic sense. The lone reference that Dr. Leonard provides when putting forth his "negative pass-through" claim provides no support for it.<sup>42</sup>

#### **4. Dr. Leonard's Empirical Estimates of Pass-Through Are Biased and Unreliable**

19. Dr. Leonard attempts to measure pass-through using Google's limited take rate reductions in the actual world.<sup>43</sup> I have previously explained why this approach does not provide a reliable basis for estimating the market-wide pass-through that would have occurred in a more competitive but-for world:

- In a more competitive but-for world, all or almost all developers would enjoy substantially and permanently lower take rates.<sup>44</sup> In contrast, Google's recent take rate reductions have generally been limited to narrowly defined SKUs comprising a small share of developer revenue, and/or short time horizons, making it unlikely

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40. Leonard Report ¶¶33.

41. *Id.*

42. *Id.*, citing Anja Lambrecht et. al., *How do firms make money selling digital goods online?* 25(3) MARKETING LETTERS 331-341 (2014) [hereafter, Lambrecht et. al.]. This article provides no support for Dr. Leonard's "negative pass-through" claim. The article does not deal with pass-through at all. It provides a review of "how digital business raise revenue," and concludes by emphasizing that the research is still "in its infancy." Lambrecht et. al. at 339 ("Conclusion[.]: In this review, we have discussed how digital businesses raise revenue. We have emphasized the strengths and weaknesses of the various revenue generators and the challenges that businesses face in earning revenue online. The literature has emphasized that selling subscriptions, advertising, and customer information can all sustain digital businesses, but this research is still in its infancy.")

43. Leonard Report ¶¶34-51.

44. Singer Class Reply Figure 1 (showing the vast majority of take rates between [REDACTED] percent). *Id.* Figure 2 (among take rates above [REDACTED] percent, and the vast majority are above [REDACTED] percent).



that any change in take rates would have had a sufficiently large and/or sustained effect on developer finances to be reflected in their pricing.<sup>45</sup>

- Google’s 2018 reduction in subscription take rates applied only to users that had maintained their subscriptions for at least one year. If a consumer has subscribed to a product for a year (or more) and paid the same monthly price, that consumer has revealed a strong willingness to pay for the subscription offering, and it would make little economic sense for a developer to target price cuts to its least price-sensitive customers.<sup>46</sup> Moreover, the pricing rules in the Play Store’s developer interface likely made it difficult or impossible for most developers to drop prices to subscribers after the first year, even if they had wanted to do so.<sup>47</sup>
- Price “stickiness,” which arises due to well-understood behavioral economic phenomena such as consumer anchoring,<sup>48</sup> would tend to limit pass-through in the actual world, while facilitating lower prices in the but-for world.<sup>49</sup> Dr. Leonard claims incorrectly that I “fail[] to recognize that any such price stickiness also would be present in the but-for world and would prevent the pass-through of a lower but-for service fee.”<sup>50</sup> This is incorrect; as I have explained, in the but-for world, lower take rates would influence developer pricing from the inception of a developer’s products, which is why price stickiness would facilitate lower prices in the but-for world.<sup>51</sup>
- In a more competitive but-for world, developers would be incentivized to pass on savings from a lower take rate via steering and discounting to induce consumers to switch to the low-cost provider. These incentives are absent in the actual world;

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45. *See, e.g.*, Singer Class Reply ¶103; ¶126.

46. *Id.* at ¶119.

47. *Id.* at ¶122.

48. *See, e.g.*, Amos Tversky & Daniel Kahneman, *Judgment under Uncertainty: Heuristics and Biases*, 184 SCIENCE 1124, 1128 (1974) (“In many situations, people make estimates by starting from an initial value that is adjusted to yield the final answer...different starting points yield different estimates, which are biased toward the initial values. We call this phenomenon anchoring.”). *See also*, Andrea Caceres-Santamaria, *The Anchoring Effect*, Federal Reserve Bank of St. Louis (2021), <https://research.stlouisfed.org/publications/page1-econ/2021/04/01/the-anchoring-effect> (“[I]t’s the initial price a consumer is exposed to that becomes a consistent reference point when shopping around. The tendency for a person to rely heavily on the first piece of information they receive when making decisions is known as the anchoring effect...Anchoring plays a role in decisions that involve numerical values such as prices...Retailers are very aware that price anchors are an effective tool they can use in their pricing strategy.”).

49. Singer Merits Report ¶370 (“When a new App (or a new form of In-App Content) is developed, a profit-maximizing developer selects a price that maximizes expected profit over the long run, taking into account costs incurred over the long run. To ensure a sufficient rate of return on its investment, a developer faced with the prospect of paying 30 percent of its revenue to Google in perpetuity will (all else equal) need to charge a higher price to consumers than a developer facing a lower take rate. Price stickiness implies that the initial price chosen for an App (or In-App Content) will influence subsequent pricing, and hence reinforces developers’ incentives to select an initial price that takes all costs (including the take rate) into account. Because developer costs would have been permanently and substantially lower due to lower take rates, prices would have been permanently and substantially lower for all or almost all developers. Thus, lower take rates would influence developer pricing from the inception of their Apps (or In-App Content).”).

50. Leonard Report ¶53.

51. Singer Merits Report ¶370.

developers that enjoyed Google's limited take-rate decreases in the actual world did not have to share any of the savings with their customers in order to realize the cost savings.<sup>52</sup>

For these reasons, and for additional reasons detailed below, Dr. Leonard's empirical estimates of pass-through are biased and unreliable.

***a. Dr. Leonard's "Real-World Examples" Do Not Reliably Estimate Pass-Through In the But-For World***

20. Dr. Leonard begins his analysis with comparisons of average prices, which he labels "real-world examples."<sup>53</sup> Dr. Leonard's "real-world examples" consist of simple before-and-after SKU-level price comparisons and make no attempt to control for factors that may influence developer pricing decisions.<sup>54</sup> Dr. Leonard's "real-world examples" suffer from many of the flaws listed in the prior section.<sup>55</sup> Moreover, as detailed below, simply adjusting Dr. Leonard's "real-world examples" for the substantial inflation that characterizes his sample period reverses his results.

21. Dr. Leonard's examples comprise too small a dataset from which to draw any conclusions. In Table 1 of his report, Dr. Leonard selects the "top 100 paid SKUs" whose take rate fell from 30 percent to 15 percent after Google decreased the take rate for small developers in mid-2021. These so-called "top 100" SKUs had aggregate consumer purchases of just [REDACTED] over the time period covered by Table 1 (July 2020 – May 2022). This represents [REDACTED] of aggregate purchases by Consumer Plaintiffs over this time period, underscoring the very limited aggregate effect of Google's reduction in take rates to small developers. More generally, Dr. Leonard's "real-world examples" in Tables 1 – 5 represent approximately [REDACTED] of aggregate purchases by Consumer Plaintiffs over this time period.

22. For the 100 SKUs in Table 1 of his report, Dr. Leonard compares (1) the average price for the twelve-month period between July 2020 – June 2021 to (2) the average price for the eleven-month period between July 2021 – May 2022. Dr. Leonard finds that the price increased for [REDACTED] of these SKUs, and decreased for [REDACTED] SKUs, and remained unchanged for [REDACTED] SKUs. According to Dr. Leonard, because only [REDACTED] out of these 100 SKUs decreased their prices in the

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52. Singer Merits Report ¶369.

53. Leonard Report ¶10(d); ¶31; ¶36.

54. For example, there is evidence that the price of [REDACTED] may have increased due to new features added in March 2022. Specifically, the developer released an [REDACTED]. See [REDACTED]

55. To summarize: Dr. Leonard's examples are necessarily limited Google's recent take rate reductions, and hence to narrowly defined SKUs comprising a small share of developer revenue, as well as short time horizons. Dr. Leonard ignores price stickiness, which would limit pass-through in the actual world, while facilitating lower prices in the but-for world. Dr. Leonard's "real-world examples" do not reflect incentives for steering and discounting that would be present in the but-for world; in contrast developers did not have to share any of the savings with their customers in order to realize the cost savings in the actual world.

eleven months following the take rate change, there is “little evidence of positive pass-through in response to the service fee rate reduction.”<sup>56</sup>

23. It also bears emphasis that the full effect of the lower take rate would take time to be reflected in a developers’ financials and would be inherently unpredictable given the structure of Google’s take rates. Consider a developer selling one of the SKUs in Table 1. At the end of July 2021, when the lower take rate of 15 percent had been in effect for approximately one month, Google’s average take rate from the developer over the past year would be 28.8 percent.<sup>57</sup> At the end of August 2021, Google’s average take rate from the developer over the past year would be 27.5 percent,<sup>58</sup> and so on. Given evidence of price stickiness in the industry, it would be surprising if the developer chose to adjust its prices downward bit by bit, month by month, to reflect the downward trajectory of the take rate on average over all of its SKUs. Dr. Leonard himself relies on economic literature providing evidence of “rigid pricing structures” driven by concerns of “user-friendliness.”<sup>59</sup> Despite price stickiness, the developer *might* consider making price adjustments *if* the impact of the lower take rate on its finances were stable and predictable, allowing the developer to commit to a new lower price on a permanent (or semipermanent) basis. For example, the developer might revisit its pricing after a full year (that is, one month after the end of Dr. Leonard’s sample). But even then, the developer’s take rate going forward is likely to be inherently unpredictable, because Google’s 15 percent take rate applies only to the first \$1 million in revenue. If the developer expects (or hopes) that its annual revenue will increase above \$1 million going forward, its take rate will also increase going forward, placing upward pressure on future pricing. This uncertainty would make it unlikely that the developer could commit to a new, lower price.

24. For all of his “real-world examples,” Dr. Leonard ignores that there was substantial inflation over the time period he studies. In an inflationary environment, firms will tend to be reluctant to decrease the nominal price of their products; even holding the nominal price constant is tantamount to a reduction in the real price. As shown illustrated below and in Appendix Table A1, when I express prices in real terms, I find that the real price decreased for [REDACTED] out of the 100 SKUs in Dr. Leonard’s Table 1, with an average decrease of [REDACTED].

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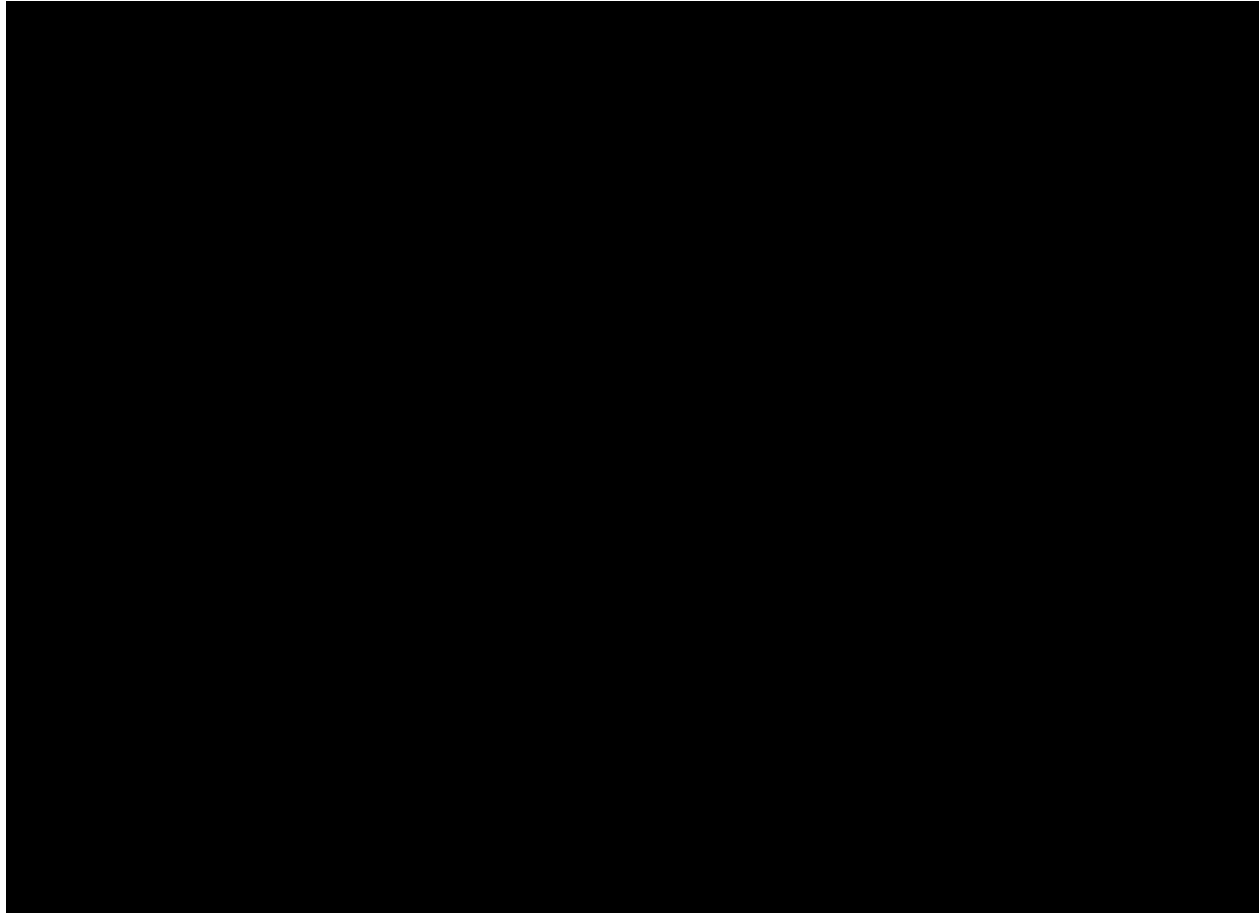
56. Leonard Report ¶38.

57. Equal to [REDACTED].

58. Equal to [REDACTED].

59. See Lambrecht et. al., *supra*, at 334 (“[M]any firms use rigid pricing structures across time and content, mainly for user-friendliness.”).

FIGURE 1: AVERAGE REAL NET PRICE OF PAID APPS IN LEONARD TABLES 1-3  
PRE- AND POST-JULY 2021 TAKE RATE REDUCTION



Sources: Appendix 2; Leonard Backup; Google Play transactions data; GOOG-PLAY-007203251; GOOG-PLAY3-000018260; FRED, *Consumer Price Index for All Urban Consumers: All Items in U.S. City Average*, available at <https://fred.stlouisfed.org/series/CPIAUCSL>. Prices adjusted for inflation using CPI with base month 7/2020. Pre-period is defined as 2020.07.01 - 2021.06.30. Post-period is 2021.07.01 - 2022.05.31.

25. In Table 2 of his report, Dr. Leonard selects the “top 100 paid SKUs” whose take rate fell at least ten percentage points after Google decreased the take rate for small developers in mid-2021. For the 100 SKUs in Table 2, Dr. Leonard again compares (1) the average price for the twelve-month period between July 2020 – June 2021 to (2) the average price for the eleven-month period between July 2021 – May 2022. Dr. Leonard finds that the price increased for [REDACTED] of these SKUs, decreased for [REDACTED] SKUs, and remained unchanged for [REDACTED] SKUs.

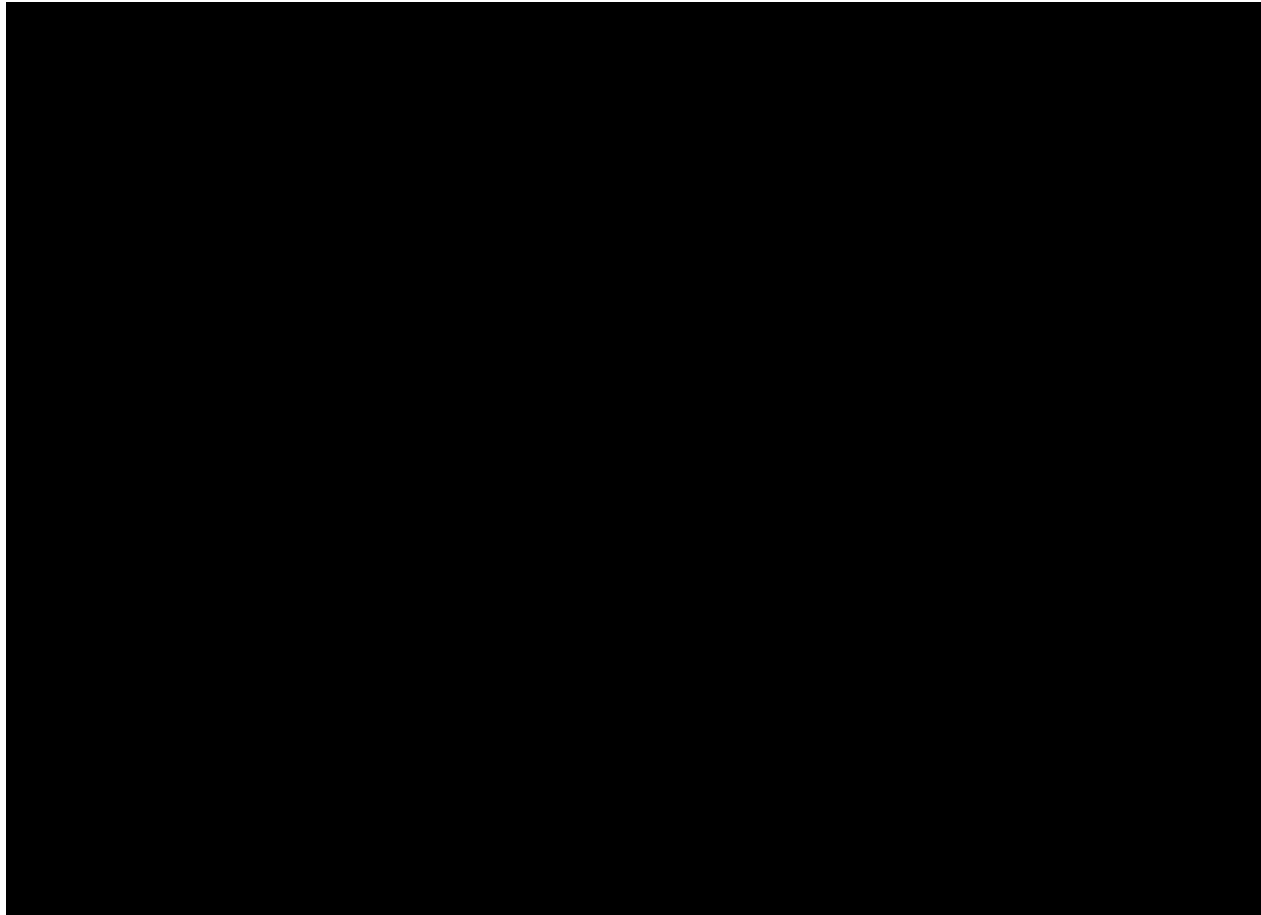
26. Dr. Leonard’s Table 2 is flawed and unreliable for the same reasons given above for Table 1. As shown above, and in Appendix Table A2, when I express prices in real terms, I find that the real price decreased for [REDACTED] out of the 100 SKUs in Dr. Leonard’s Table 2, with an average decrease of [REDACTED].

27. In Table 3 of his report, Dr. Leonard selects the “top 100 paid apps ranked by consumer spend among all paid apps.” For the 100 SKUs in Table 3, Dr. Leonard again compares (1) the average price for the twelve-month period between July 2020 – June 2021 to (2) the average

price for the eleven-month period between July 2021 – May 2022. Dr. Leonard finds that the price increased for █ of these SKUs, decreased for █ SKUs, and remained unchanged for █ SKUs.

28. Dr. Leonard's Table 3 is flawed and unreliable for the same reasons given above for Table 1. In addition, because the average take rate for these SKUs declined by █ percentage points (from █ percent to █ percent), the take rate decrease would take even longer to be reflected in developers' financials. Further, the SKUs in Dr. Leonard's Table 3 account for just █ percent of consumer expenditure for the developers that sell these SKUs. This makes it even less likely that these developers would make price adjustments based on the lower take rates shown in Table 3, given that developers make pricing decisions at the firm level, as opposed to the SKU level. As shown above and in Appendix Table A3, when I express prices in real terms, I find that the real price decreased for █ out of the 100 SKUs in Dr. Leonard's Table 3, with an average decrease of █.

FIGURE 2: AVERAGE REAL NET PRICE OF IAPs IN LEONARD TABLES 4-5  
PRE- AND POST-JULY 2021 TAKE RATE REDUCTION



Sources: See Figure 1, *supra*.

29. In Table 4 of his report, Dr. Leonard selects the “Top 100 IAPs with A Flat Service Fee Rate Reduction of 15 Percentage Points.” For the 100 SKUs in Table 4, Dr. Leonard again compares (1) the average price for the twelve-month period between July 2020 – June 2021 to (2) the average price for the eleven-month period between July 2021 – May 2022. Dr. Leonard finds

that the price increased for [REDACTED] of these SKUs, decreased for [REDACTED] SKU, and remained unchanged for [REDACTED] SKUs.

30. Dr. Leonard's Table 4 is flawed and unreliable for the same reasons given above for Table 1. In addition, the SKUs in Dr. Leonard's Table 4 account for [REDACTED] of consumer expenditure for the developers that sell these SKUs. This makes it even less likely that these developers would make price adjustments based on the lower take rates shown in Table 4, given that developers make pricing decisions at the firm level, as opposed to the SKU level. Further, as shown above and in Appendix Table A4, when I express prices in real terms, I find that the real price decreased for [REDACTED] out of the 100 SKUs in Dr. Leonard's Table 4, with an average decrease of [REDACTED].

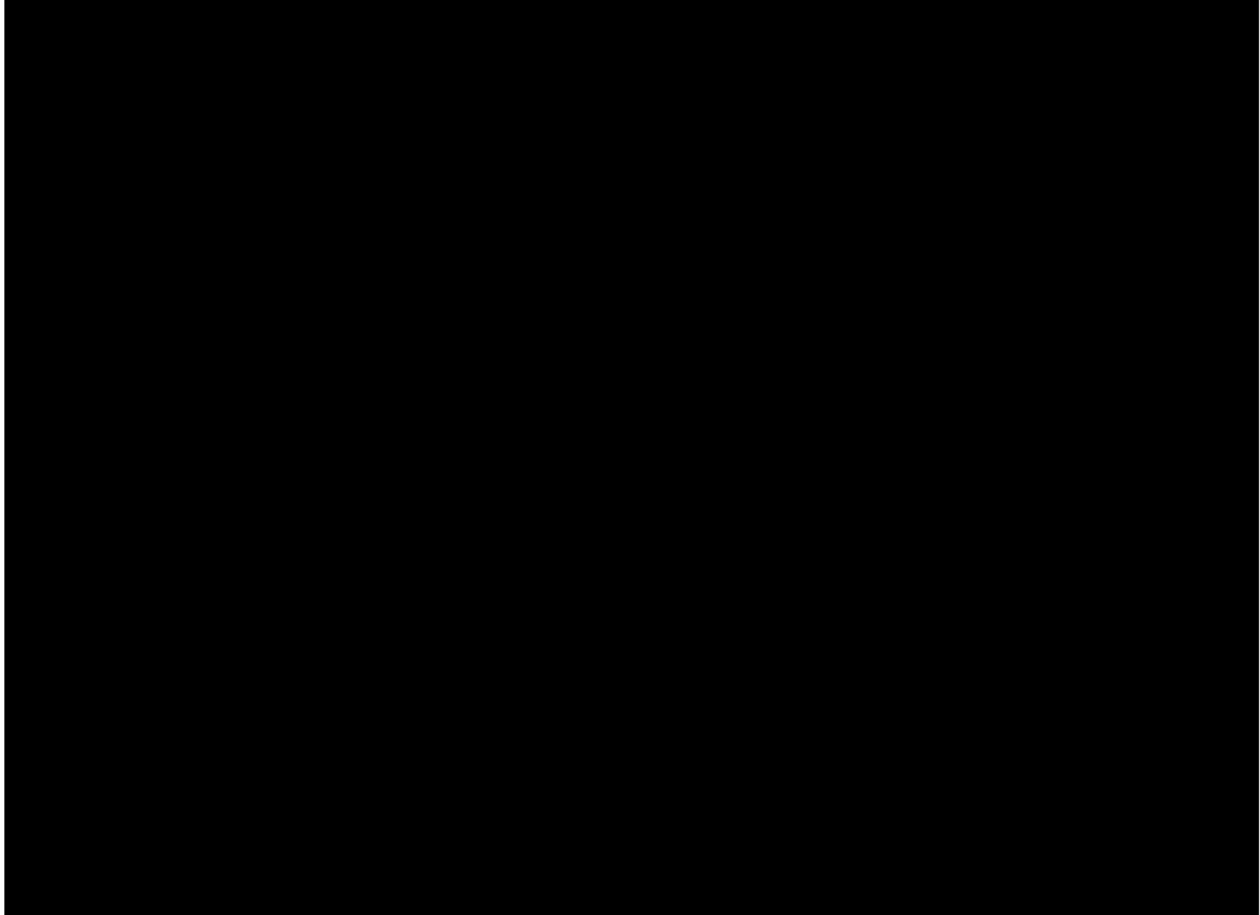
31. In Table 5 of his report, Dr. Leonard selects the "Top 100 IAPs with A Service Fee Rate Reduction of At Least 10 Percentage Points." For the 100 SKUs in Table 5, Dr. Leonard again compares (1) the average price for the twelve-month period between July 2020 – June 2021 to (2) the average price for the eleven-month period between July 2021 – May 2022. Dr. Leonard finds that the price increased for [REDACTED] of these SKUs, decreased for [REDACTED] SKU, and remained unchanged for [REDACTED] SKUs.

32. Dr. Leonard's Table 5 is flawed and unreliable for the same reasons given above for Table 1. In addition, the SKUs in Dr. Leonard's Table 5 account for [REDACTED] of consumer expenditure for the developers that sell these SKUs. This makes it even less likely that these developers would make price adjustments based on the lower take rates shown in Table 5, given that developers make pricing decisions at the firm level, as opposed to the SKU level. Further, as shown above and in Appendix Table A5, when I express prices in real terms, I find that the real price decreased for [REDACTED] out of the 100 SKUs in Dr. Leonard's Table 5, with an average decrease of [REDACTED].

33. Dr. Leonard declined to present a "real-world analysis" on any subscription developer (other than Tinder), despite having plentiful data on subscription developers available to him. As seen below and in Appendix Tables A6-A8, when I conduct an analysis of subscription SKUs analogous to Dr. Leonard's, I find that the real price decreased for [REDACTED] out of the top subscription 100 SKUs with a take rate reduction of 15 percentage points after July 2021, with an average decrease of [REDACTED].



FIGURE 3: AVERAGE REAL NET PRICE TOP SUBSCRIPTION SKUs  
PRE- AND POST-JULY 2021 TAKE RATE REDUCTION



34. Dr. Leonard's Table 7, which is specific to Tinder, is flawed and unreliable for many of the same reasons given above. In Table 7, Dr. Leonard first compares the average Tinder price between July 2020 and June 2021 to the average price between July 2021 and December 2021. Dr. Leonard finds that Tinder's average price increased from [REDACTED] to [REDACTED] over this interval, which likely reflects improvements to Tinder's offerings.<sup>60</sup> Dr. Leonard next compares the average price between July 2021 and December 2021 to the average price between January 2022 and May 2022. Tinder's take rate fell by approximately [REDACTED] percent over this interval.<sup>61</sup> Dr. Leonard finds that the average Tinder price increased from [REDACTED] to [REDACTED], or [REDACTED] [REDACTED]. Over this interval, the Consumer Price Index increased by approximately four percent.<sup>62</sup>

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60. Tinder debuted its "Tinder Explore" feature in September 2021, which it described as "the biggest update to Tinder since the invention of the original Swipe feature," and which supported (among other things) searching for matches by interest, and made it easier for users to access exclusive social experiences. Tinder Press Room, *Tinder Opens This Fall's Hottest New Venue: Tinder Explore* (Sept. 8, 2021), <https://www.tinderpressroom.com/2021-09-08-Tinder-Opens-This-Falls-Hottest-New-Venue-Tinder-Explore>.

61. Leonard Report Table 7.

62. See, e.g., FRED, *Consumer Price Index for All Urban Consumers: All Items in U.S. City Average*, <https://fred.stlouisfed.org/series/CPIAUCSL>.

Thus, during the second interval in Dr. Leonard's Table 7, when Tinder's take rate fell the most, Tinder's real price also declined.

***b. Dr. Leonard's "Synthetic Control" Regressions Do Not Reliably Estimate Pass-Through In the But-For World***

35. Perhaps recognizing the deficiencies of his initial analysis, Dr. Leonard implements a "synthetic control" regression purporting to measure the pass-through rate.<sup>63</sup> In this analysis, Dr. Leonard relies on comparisons of two groups of SKUs. He calls one group "Treated SKUs," which he defines as "SKUs subject to a 29.5%-30.5% service fee rate in a pre period (from July 2020 to June 2021) and 14.5%-15.5% in a post period (from July 2021 to May 2022)."<sup>64</sup> He calls the other group "Control SKUs," which he defines as "SKUs subject to a 29.5%-30.5% service fee rate throughout July 2020 and May 2022."<sup>65</sup>

36. Dr. Leonard's synthetic control regressions suffer from many of the same flaws as his "real-world examples," which I have detailed above. Dr. Leonard's regressions use exactly the same time period as his "real-world examples," (July 2020 – May 2022) and divide the time period in exactly the same way.<sup>66</sup> As explained above, this makes it unlikely that any change in take rates would have had a sufficiently large and/or sustained effect on developer finances to be reflected in the observed prices.

37. As illustrated below, there are vast differences in the size of the developers in the two groups. For example, the average annual per-developer consumer expenditure in Dr. Leonard's "control group" comes to [REDACTED] in 2021. In that year, the average annual per-developer consumer expenditure in Dr. Leonard's "treatment group" was approximately [REDACTED].

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63. Leonard Report ¶¶47-51.

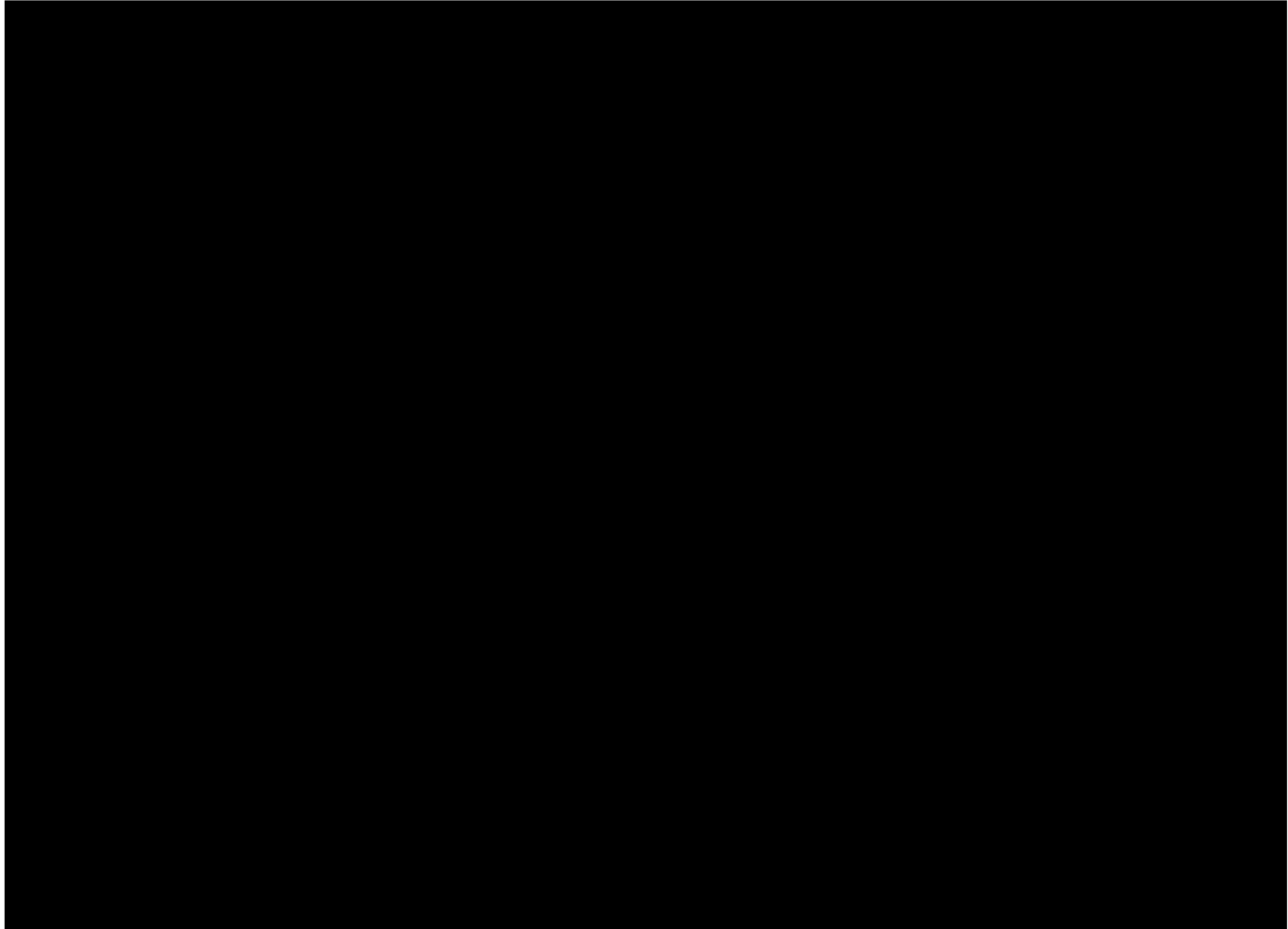
64. Leonard Report Exhibit 5, Note [1].

65. Leonard Report Exhibit 5, Note [1].

66. Leonard Report Exhibit 5, Note [1]; *see also* Appendix C, ¶6. As before, Dr. Leonard focuses on SKU-level comparisons, without regard to the extent to which a developer did (or did not) enjoy cost savings in the aggregate.



FIGURE 4: AVERAGE ANNUAL PER-DEVELOPER EXPENDITURE FOR DEVELOPERS IN DR. LEONARD'S PASS-THROUGH REGRESSION



Source: Leonard backup materials. In 2022, data are available through May; above they are annualized (multiplied by 12/5). As noted above, Dr. Leonard limits his analysis to July 2020 – May 2022.

38. Dr. Leonard's "treatment group" represents only a small fraction of consumer expenditure in the Play Store. Over the time period analyzed by Dr. Leonard (July 2020 – May 2022), consumer expenditures in Dr. Leonard's "treatment group" came to approximately [REDACTED] of aggregate purchases by Consumer Plaintiffs over this time period.<sup>67</sup>

39. More fundamentally, Dr. Leonard violates the necessary basis for synthetic control analysis: a clean control group (or "comparison group") from which the Challenged Conduct is absent.<sup>68</sup> None of the SKUs in Dr. Leonard's control group reflect pricing in a more competitive but-for world with substantially and permanently lower take rates for all or almost all developers

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67. Specifically, I summed up the final consumer spend of all observations in Leonard's regression data backup with a "treat\_group" value equal to 1. This amounted to [REDACTED]. I then divided this by the final consumer spend for all transactions over the period 7/2020–5/2022, equal to [REDACTED].

68. Alberto Abadie, *Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects* 59(2) JOURNAL OF ECONOMIC LITERATURE 391, 409 (2021) ("[I]nference based on these methods will be faulty in the absence of a suitable comparison group...it is important that not all units adopt interventions similar to the one under investigation during the period of study.").

in the relevant markets at issue. In addition, Dr. Leonard has no way to control for price stickiness, which will influence pricing in both the control group and the treatment group. Predictably, Dr. Leonard's analysis produces nonsensical results inconsistent with standard economics; he is unable to determine even the sign of the pass-through rate, let alone the magnitude.<sup>69</sup>

**B. Dr. Leonard Fails to Undermine the Well-Established Economic Models and Methods That I Use to Estimate Take Rates in a More Competitive But-For World**

40. To calculate the take rate that would have prevailed in a more competitive but-for world, I used a standard two-sided platform pricing model developed by a Nobel prize-winning economist ("Rochet & Tirole (2003)").<sup>70</sup> Dr. Leonard does not dispute that this model is standard or that it is widely used by economists to analyze two-sided platforms. His critiques are limited to the inputs used to implement Rochet & Tirole (2003); as explained below, these critiques do not undermine my conclusions.

41. My economic model conservatively assumes that the Play Store would continue to retain a market share of approximately 60 percent of its prior level in the but-for world.<sup>71</sup> This is based my examination of the market shares of historically dominant firms that went on to face some degree of competition in different industries.<sup>72</sup> Sixty percent was approximately AT&T's market share in the long-distance market after competitive entry.<sup>73</sup> This estimate is conservative in relation to market share and concentration statistics for e-commerce markets, in which the payment method is generally not tied to the rest of the transaction.<sup>74</sup>

42. Dr. Leonard claims that AT&T's market share is not a suitable benchmark because the industry is not sufficiently "economically similar"<sup>75</sup> to the markets at issue here. In fact, AT&T was a prime example of a platform monopolist, benefitting from network effects, that leveraged monopoly power in the (ancillary) long-distance market from its monopoly in local service, before eventually being forced to open the long-distance market to competition—just as Google is a network monopolist that leveraged its power in the Android App Distribution Market into the In-App Aftermarket. Dr. Leonard ignores that economic models are not industry-specific; what matters the similarity in competitive dynamics across different industries.

43. Moreover, ample evidence from a range of additional industries, including network industries where market power was leveraged from the core into an ancillary market (such as Microsoft), supports my conclusion that Google's market share would have decreased substantially in a more competitive but-for world. If anything, the evidence shows that 60 percent is likely a conservative estimate of Google's market share after competitive entry.

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69. Leonard Report ¶51.

70. Singer Merits Report Part VI.B.

71. Singer Merits Report ¶331.

72. Singer Merits Report ¶331; Singer Class Reply ¶¶91-94.

73. Singer Merits Report ¶331.

74. Singer Merits Report ¶331.

75. Leonard Report ¶92.

44. Netflix, which made streaming video on demand (SVOD) a staple of home entertainment, dominated the market for streaming video services for years.<sup>76</sup> As recently as 2014, approximately nine out of every ten SVOD households were Netflix subscribers.<sup>77</sup> More recently, Netflix's market share has eroded as competitors such as Amazon Prime, HBO Max, and others have gained at its expense.<sup>78</sup> As of Q4 2021, Netflix had a streaming share of just 25 percent, compared to Amazon Prime's 19 percent, Disney + and Hulu at 13 percent each, and HBO Max at 12 percent.<sup>79</sup>

45. The personal computer (PC) market has also seen dominant firms lose substantial share. The IBM brand was nearly synonymous with the industry for decades. However, competition from other PC makers such as Compaq and Apple Computer dissipated IBM's market share, which fell from 80 percent to 20 percent in the decade between 1982 and 1992.<sup>80</sup> In 2004, IBM sold its personal computer business to Lenovo, which maintained a 24.6 percent worldwide market share in 2021, compared to 21.1 percent for HP, 19.5 percent for Dell, and around 7 percent each for Apple, Acer, and ASUS.<sup>81</sup>

46. Competitive entry in the Internet browser market eroded the market share of Microsoft's Internet Explorer. In 2004, Internet Explorer enjoyed 95 percent market share.<sup>82</sup> By June 2010, its market share had slipped to 53.8 percent, as Firefox (30.6 percent), Apple Safari (6.8 percent), and Google Chrome (5.7 percent) competed for users.<sup>83</sup> Recently, Google Chrome has supplanted Microsoft's browser offering (now called Edge) at the top of the market, with a

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76. See, e.g., James Brumley, *Netflix is Losing Market Share, but This is the Actual Risk to Shareholders*, THE MOTLEY FOOL (Apr. 25, 2021), <https://www.fool.com/investing/2021/04/15/netflix-is-losing-market-share-but-thats-not-the-a/> ("Netflix ( NFLX -1.73% ) is losing market share to be sure -- but consider the circumstances. It was the first company to make streaming video a mainstream phenomenon, and for years, it was the only serious name in the business. It's only natural that the recent launches of big rival services such as Disney's ( DIS 0.00% ) Disney+ and AT&T's ( T 1.73% ) HBO Max would chip away at Netflix's share of the on-demand video space.").

77. Nielsen, *The Total Audience Report Q4 2014*, at 5, available at [nielsen.com/wp-content/uploads/sites/2/2019/04/total-audience-report-q4-2014.pdf](https://www.nielsen.com/wp-content/uploads/sites/2/2019/04/total-audience-report-q4-2014.pdf) (showing 40.3 percent of US TV households with SVOD, and 36 percent of US TV households subscribing to Netflix).

78. Georgina Tzanetos, *Netflix Loses 31% Market Share as Streaming Rivals Gain Loyal Subscribers*, YAHOO!, (April 7, 2021), available at <https://www.yahoo.com/video/netflix-loses-31-market-share-204537722.html>.

79. Joe Wituschek, *Apple TV+ gains market share in the United States while Netflix loses it*, JUSTWATCH (Jan. 24, 2022), available at <https://www.imore.com/apple-tv-gains-market-share-united-states-while-netflix-loses-it>. See also Brumley, *supra* ("Data from market intelligence outfit eMarketer lets us flesh out this trend with some numbers. It reports that Netflix secured 36.2% of the U.S. over-the-top television industry's revenue in 2020, down from 44.4% in 2019. By 2022, its share is expected to be down to 28.4%, and almost even with Disney's slice of the U.S. streaming market.").

80. James W. Cortada, *How the IBM PC Won, Then Lost, the Personal Computer Market - Not even Big Blue could keep up with its creation's success*, IEEE SPECTRUM (July 21, 2021), available at <https://spectrum.ieee.org/how-the-ibm-pc-won-then-lost-the-personal-computer-market>.

81. Gartner Press Release, *Gartner Says Worldwide PC Shipments Declined 5% in Fourth Quarter of 2021 but Grew Nearly 10% for the Year* (Jan. 12, 2022), available at <https://www.gartner.com/en/newsroom/press-releases/2022-01-12-gartner-says-worldwide-pc-shipments-declined-5-percent-in-fourth-quarter-of-2021-but-grew-nearly-10-percent-for-the-year>.

82. TheCounter.com, Browser Stats, April 2004, archived at <https://web.archive.org/web/20111101195133/http://www.thecounter.com/stats/2004/April/browser.php>.

83. AT INTERNET INSTITUTE, *Are we heading towards the end of Internet Explorer's reign in Europe?* (July 27, 2010), archived at <https://web.archive.org/web/20100806153329/http://www.atinternet-institute.com/en-us/browsers-barometer/browser-barometer-june-2010/index-1-2-3-205.html>.

usage share of 65 percent of all browsers, compared to 19 percent for Safari and only 4 percent for Edge.<sup>84</sup>

47. According to Dr. Leonard, none of the industries above are sufficiently similar to the markets at issue here.<sup>85</sup> By Dr. Leonard's standard, no benchmark would ever be suitable, because there will always be differences from one industry to the next.

48. Dr. Leonard's attempts to show that damages are "highly sensitive to economically plausible changes" in market shares<sup>86</sup> are unpersuasive. Despite offering no evidence that the Play Store's but-for market share would have been greater than 60 percent, Dr. Leonard arbitrarily recalculates damages by plugging in ever-higher but-for market share values, offering no explanation for why any of his scenarios are "economically plausible."<sup>87</sup>

49. Moreover, Dr. Leonard purports to demonstrate sensitivity by changing the actual and but-for market shares simultaneously. For example, Dr. Leonard emphasizes that, for my Single Take-Rate Model, "[s]etting the actual share to be 85% and the but-for share 75%... reduces Dr. Singer's damages by 68.5%.<sup>88</sup> This is hardly surprising, as Dr. Leonard is telling the model that Google's share would fall by only ten percentage points, as opposed to the approximately 40 percentage-point decrease that provides the basis for damages. If instead I set Google's actual market share to 85 percent, while maintaining the same proportional decrease in market share, the but-for take rate remains the same for my Single Take-Rate Model.<sup>89</sup> Similarly, if I assume that Google's initial share of the In-App Aftermarket is 85 percent (rather than 97 percent), the change in the but-for take rate is modest.<sup>90</sup>

50. For the In-App Aftermarket, my damages calculations utilize a standard economic framework developed by Landes and Posner (the "Landes-Posner Model").<sup>91</sup> Applied here, the Landes-Posner Model allows me to estimate how Google would respond if, instead of enjoying a monopoly on services in the In-App Aftermarket, it were forced to compete with entrants who would push the market price of these services closer to their marginal cost. Dr. Leonard does not dispute that the Landes-Posner model is standard and well-accepted, or that economists have used it to study industries in which previously dominant firms face competitive entry. Published, peer-reviewed economic studies have employed the Landes-Posner model when the competitive fringe accounted for more than 40 percent or more of the market.<sup>92</sup>

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84. STATCOUNTER GLOBALSTATS, Browser Market Share Worldwide, October 2021, *available at* <https://gs.statcounter.com/browser-market-share#monthly-202110-202110-bar>.

85. Leonard Report ¶94.

86. Leonard Report ¶97.

87. Leonard Report ¶97.

88. Leonard Report ¶97; Figure 9.

89. In the Single Take-Rate Model, the reduction in the take rate is independent of the initial market share. What matters for modeling purposes is that Google would capture 60 percent of its initial share.

90. If Google's actual market share is 85 percent, a proportional decrease would make its but-for share approximately 53 percent (equal to  $0.85 \times (0.6/0.97)$ ). Under these assumptions, the but-for take rate for my In-App Aftermarket model would be 13.9 percent, instead of the 14.4 percent but-for take rate calculated in my Merits Report.

91. Singer Merits Report ¶¶326-330.

92. Singer Merits Report ¶329 (citing an economic study in which the dominant firm, Alcoa, had a market share of just 35 percent during the relevant time period, with the competitive fringe accounting for the remaining 65 percent).

51. My Merits Report used the standard formula given in the Landes-Posner Model to determine the extent to which Google's own-price elasticity would increase in the but-for world. According to this formula, Google's own-firm elasticity would increase as its market share falls in the but-for world.<sup>93</sup> Consistent with how this formula has been applied in the peer-reviewed economics literature, I held the market elasticity constant while solving for Google's but-for own-firm elasticity.<sup>94</sup> Dr. Leonard attempts to demonstrate that my model is sensitive to the form of the demand curve by arbitrarily imposing linear demand and showing that damages fall by 45 to 50 percent.<sup>95</sup> Dr. Leonard performs no empirical testing of any kind to justify using a linear demand curve. I have performed this analysis, and found that linear demand does not fit the data well.<sup>96</sup> Moreover, as Dr. Leonard concedes, imposing linear demand is tantamount to imposing a much lower pass-through rate (50 percent) than the pass-through rate that I calculated using standard empirical economic methods (91 percent).<sup>97</sup> It is no great surprise that arbitrarily cutting the pass-through rate by about half also reduces damages by about half nor does it undermine my conclusions.

52. My Merits Report explained that although I conservatively allow Google to charge a substantial markup in the but-for world and to retain 60 percent of its prior market share, the remainder of the market would be characterized by competition among providers of homogeneous commodity services, which could be offered by a range of potential rivals with few barriers to entry or expansion.<sup>98</sup> Dr. Leonard asserts incorrectly that the Landes-Posner Model is "not a sound fit" because that model assumes that Google would face just such a market structure in the but-for world, and because I purportedly provide no support for applying the standard Landes-Posner Model of homogenous commodity services competition among the competitive fringe.<sup>99</sup> In fact, my report cites extensive record evidence in support of this market structure,<sup>100</sup> and lists a range of existing rivals that could be potential entrants in a more competitive but-for world.<sup>101</sup> Similarly, Dr. Leonard is incorrect to claim that the econometric estimate of the supply elasticity for AT&T's long-distance competitors that I employed in my Merits Report<sup>102</sup> is inapplicable because AT&T faced a "considerably fragmented set of individually relatively small competitors," and because

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93. As seen in Table 8 of the Singer Report, Google's own-firm demand elasticity would increase from approximately [REDACTED] in the actual world to [REDACTED] in the but-for world. Singer Merits Report Table 8, Rows [9], [14].

94. See Singer Merits Report ¶¶328-329 and literature cited therein.

95. Leonard Report ¶¶98-100.

96. As shown in Appendix 3, linear demand does not fit the data well. Contrary to economics, the price coefficients are statistically insignificant in 12 out of the 33 regressions.

97. Leonard Report ¶100 ("With a linear demand curve, the pass-through rate is 50%[.]").

98. Singer Merits Report ¶¶322-326.

99. Leonard Report ¶¶106-107.

100. Singer Merits Report ¶¶322-326.

101. Tables 9 – 10 of my Merits Report list a range of potential rivals, including Paddle, PayPal, Stripe, Amazon Pay, Square, and many others. Dr. Leonard claims that two of these potential rivals (PayPal and Stripe) are not suitable benchmarks because "PayPal holds a market share by the number of transactions of 54% in the online payment processing market, and Stripe holds a market share of 19%." Leonard Report ¶103. I have seen no evidence that PayPal or Stripe have significant market power in their existing markets, which implies that their market shares are maintained by competitive pricing. Moreover, these existing markets are distinct from the In-App Aftermarket. Dr. Leonard provides no evidence that there would be barriers to entry in the In-App Aftermarket, or that services in the In-App aftermarket would not be homogenous, or that the number of potential entrants would be limited.

102. Singer Merits Report ¶332.



long-distance service is relatively homogenous.<sup>103</sup> Dr. Leonard ignores that AT&T faced long-distance fringe rivals such as MCI and Sprint, which had significant market shares, yet the Landes-Posner Model was still applicable to the industry.<sup>104</sup> Similarly, there are a large number of potential entrants in the In-App Aftermarket, which would provide homogeneous commodity services.

53. Dr. Leonard claims incorrectly this market structure is inconsistent with the fact that my analysis of a potential but-for world requires entry by only one viable rival App store.<sup>105</sup> This critique confuses but-for competition in the Android App Distribution Market (which, for such competition to drive down prices, could involve only one rival App store, or a handful of rival App stores, offering matchmaking services in competition with the Play Store) with but-for competition in the In-App Aftermarket (which would be characterized by competition to provide homogeneous services). My economic models account for this difference by assuming that Google faces an inelastic supply response from its rival(s) in the Android App Distribution Market,<sup>106</sup> and an elastic supply response in the In-App Aftermarket.<sup>107</sup>

### C. Dr. Leonard's Critiques of My Direct Consumer Discount Model Are Without Merit

54. In competitive markets, two-sided platforms frequently compete by offering direct discounts to consumers. Google offers limited consumer discounts even today (██████████), and the Amazon Appstore offers far more generous discounts (██████████) on Google Android devices. In my Merits Report, I calculated overcharges to the Consumer Class by estimating the extent to which Google would have offered more generous consumer discounts, resulting in lower net prices.<sup>108</sup> The damages calculated from these models are simply consumer overcharges viewed from the consumer side of the platform. Specifically, my two-sided Discount Model calculates damages using a two-sided market model in which competition occurs over customer discounts, instead of the take rate. My Amazon Discount Model calculates damages based on the discounts that Amazon provides to customers accessing the Amazon Appstore via Google Android devices.

55. Dr. Leonard has no new critiques of my two-sided Discount Model beyond the critiques of the Rochet-Tirole model addressed above. With respect to Amazon Discount Damages, Dr. Leonard offers no alternative damages calculations or other quantitative critiques. Dr. Leonard does claim that “Amazon Coins operates in a fundamentally different way than

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103. Leonard Report ¶102.

104. Simran Kahai, David Kaserman & John Mayo, *Is the “Dominant Firm” Dominant? An Empirical Analysis of AT&T’s Market Power*, 39 JOURNAL OF LAW & ECONOMICS 499, 503 (1996) (“AT&T’s two largest competitors, MCI and Sprint, have grown considerably. At the beginning of the sample period, the revenue-based market shares of these two firms were 5.5 and 2.6 percent, respectively. In 1988, these market shares were 10.3 and 7.2 percent, and by 1993 they had grown to 17.8 and 10.0.”).

105. Leonard Report ¶107.

106. Singer Merits Report ¶304, n. 686.

107. Singer Merits Report ¶332.

108. In footnote 141 of his report, Dr. Leonard suggests that developers might increase their App prices in response to greater consumer subsidies. I have seen no evidence that developers have done so in response to Google’s Play Points subsidies, or in response to the Amazon Coin subsidies. This “reverse pass-through” claim is at odds with record evidence cited in my Merits Report showing the success of consumer subsidies in Japan and Korea. Singer Merits Report ¶¶374-377. Consumer subsidies would not be effective in attracting consumers if they subsidies were offset by higher prices, as Dr. Leonard claims.

Google Play Points;”<sup>109</sup> he observes that Amazon Coins requires a minimum purchase (of \$3), cannot be converted back into cash, offers lower discounts on lower purchase volumes, cannot be used “to buy in-app subscriptions,” and cannot be “used together with cash or other forms of payment.”<sup>110</sup> Dr. Leonard ignores that my Amazon Discount Damages account for such factors because they are based on the discounts actually redeemed by consumers in the Amazon Appstore, according to Amazon’s own data.

56. Moreover, my Amazon Discount Damages do not assume that Google would adopt an identical consumer subsidy mechanism in a more competitive but-for world; the calculations assume only that Amazon’s aggregate discounts provide a reliable estimate of the aggregate discounts that consumers could expect to receive in a more competitive but-for world. The Amazon Discount Damages provide a metric for the kinds of discounts that Google would have had to match if it faced real competition.

57. Dr. Leonard claims that I offer no evidence as to “why the consumer demand, costs, business strategy, and competition for the Amazon Appstore on third party devices in the actual world would be similar to that of Google Play in the but-for world[.]”<sup>111</sup> But as I explained in my Merits Report, there is sound economic justification underlying the notion that Amazon’s aggregate discounts in the actual world provide a reliable estimate for the Play Store’s aggregate discounts in a more competitive but-for world: The Amazon Appstore participates in Android App Distribution Market; like the Play Store, the Amazon Appstore is available on third-party smartphones and tablets that Amazon does not own. The key difference between them is that the Amazon Appstore is not dominant in the Android App Distribution Market and is obliged to compete on the merits. Amazon has chosen to compete by offering generous consumer subsidies, and according to Amazon’s own documents, these generous consumer subsidies have been the most effective competitive strategy for the Amazon Appstore on third-party devices.<sup>112</sup>

#### **D. The Claims of Dr. Leonard and the Other Google Experts Regarding Markets In China Do Not Undermine my Conclusions**

58. Dr. Leonard presents China as a “Comprehensive Benchmark for the But-For World,” and claims, based on the Chinese experience, that Class Members would be worse off in the but-for world.<sup>113</sup> Dr. Gentzkow makes similar claims.<sup>114</sup> For example, Dr. Gentzkow claims that the Chinese Android ecosystem is a “vivid illustration of what a world without Google’s current conduct might look like,”<sup>115</sup> and goes on to detail “severe fragmentation”<sup>116</sup> in China without considering whether these problems might be caused by other aspects of the economic environment in China.

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109. Leonard Report ¶111.

110. Leonard Report ¶111.

111. Leonard Report ¶112.

112. Singer Merits Report ¶115.

113. Leonard Report ¶169; ¶¶179-83.

114. Gentzkow Report ¶¶641-643.

115. Gentzkow Report ¶641.

116. Gentzkow Report ¶642.

59. The Google Experts fail to identify a more basic likely cause of the fragmented nature of app stores in China: limited intellectual property protections and widespread app scraping. Record evidence indicates [REDACTED]

[REDACTED]. According to a Google presentation cited by Dr. Gentzkow, Chinese app stores [REDACTED] and as a result, [REDACTED]

[REDACTED]<sup>117</sup> This evidence is consistent with broader evidence of software piracy in China.<sup>118</sup> Lacking the ability to choose which app stores do and do not list their apps, it is common in China for app developers to acquiesce and attempt to earn revenue from app stores that scrape their apps by contacting those app stores and claiming the app as their own.<sup>119</sup>

60. The proliferation of app stores in China may therefore be attributable to the fact that app developers have no ability to choose to congregate in a smaller number of well-run stores. It may also explain the higher rates of malware in China highlighted by the Google Experts: If Chinese App developers had better control over where their apps were listed, they would have reputational economic incentives not to list their apps in venues prone to malware or other security risks.

61. The prevalence of app scraping may also explain the higher prevailing take rates on some Chinese app stores highlighted by the Google Experts. It would be economically rational for developers in the Chinese market to accept higher take rates on App stores that can offer protection against the general lack of robust property rights for their Apps, including the risks of piracy and malware. Put another way, developers would rationally pay higher take rates to purchase insurance against the risk of having their intellectual property appropriated—from the developer’s perspective, a take rate of 50 percent is better than a take rate of 100 percent.

62. Higher prevailing take rates among some app stores in China may also be attributed to costly monitoring apparatuses they are required to set up to assist in Government oversight and censorship, and the liability risks stores face for regulatory failures. Chinese app stores are regulated by the Chinese Ministry of Industry and Information Technology (MIIT), the agency that regulates telecommunications providers.<sup>120</sup> I understand that the MIIT requires that app stores hold an “Internet Content Provider” (ICP) license, a license that has historically required its holder “to prevent the appearance of politically objectionable content through automated means, or to police content being uploaded by users for unacceptable material,” and license holders risk being “held liable for all content appearing on their websites,” including content created by “users of its . . . sharing services.”<sup>121</sup> This cooperation with Chinese censors imposes significant costs on app

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117. GOOG-PLAY-000272539.R at –578.R.

118. As of 2017, approximately 70% of computers in China were running pirated versions of software—the highest rate reported among large countries. See U.S. News, “China Has a Fondness for Pirated Software” (May 16, 2017), <https://www.usnews.com/news/business/articles/2017-05-16/chinas-fondness-for-pirated-software-raises-risks-in-attack>.

119. GOOG-PLAY-000272539.R at –583.R-584.R.

120. Simmons + Simmons, “China strengthens regulation of app stores” (Feb. 13, 2017), <https://www.simmons-simmons.com/en/publications/ck0bdr12qo3bz0b33nekzx642/13-china-strengthens-regulation-of-app-stores>.

121. Human Rights Watch, “Race to the Bottom: Corporate Complicity in Chinese Internet Censorship” (Aug. 9, 2006), <https://www.hrw.org/report/2006/08/09/race-bottom/corporate-complicity-chinese-internet-censorship>.



stores. For instance, all Chinese mobile games must go through a content review by the National Press and Publication Administration, and app stores must “set up convenient methods for reporting and recording complaints, and promptly handle these complaints and reports.”<sup>122</sup> If app stores fail to satisfy these obligations, they “can be held liable for content posted and spread by their users, especially if they did not have effective auditing systems in place to help prevent it.”<sup>123</sup>

63. China has also increased the regulatory burden on app stores in recent years. In June 2016, the Cyberspace Administration of China (CAC) issued new rules for app stores.<sup>124</sup> These rules allocated responsibility for much of the government’s oversight of apps to app stores themselves, including storing a “vast amount of personal data” required under China’s “real name registration” rules, and issuing warnings and suspending app developers who fail to comply with state regulations.<sup>125</sup> The CAC further required that Chinese app stores “conduct an authenticity, security and legality review of the app developers whose apps are made available in their stores.”<sup>126</sup> I understand that app stores in China can be held liable for violations by the apps they list.<sup>127</sup>

64. The need to monitor individual apps, and the risk of liability from any given app, implies that the regulatory costs incurred by Chinese app stores are to a significant extent variable costs that grow with the size of the platform. As a result, Chinese app stores would be expected to recoup pass on these costs in the form of higher take rates on developers.

#### **E. Dr. Leonard’s Remaining Critiques Are Without Merit**

65. In my Merits Report, my logit regressions were structured around App categories used by Google, developers, and consumers. The evidence shows that App categories consist of economically reasonable groupings of consumer tastes for different varieties of Apps, as recognized by a range of industry participants, including Google. The Play Store’s categories are used by industry analysts. Developers, who presumably know their customers best, use Google’s categories to sell their Apps in competition with other developers; they have clear incentives to select a meaningful category to maximize the value of their Apps. The evidence also shows that the Play Store’s categories are economically meaningful to consumers, given their prominent

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122. AppInChina, “Making Your Mobile App or Game Compliant With Chinese Law”, <https://www.appinchina.co/services/localization/compliance/>.

123. *Id.*

124. Norton Rose Fulbright, “China issues new rules to tighten regulation of Mobile Apps market” (July 2016), <https://www.nortonrosefulbright.com/en/knowledge/publications/93003105/china-issues-new-rules-to-tighten-regulation-of-mobile-apps-market>.

125. *Id.*

126. Simmons + Simmons, “China strengthens regulation of app stores”, (Feb. 13, 2017), <https://www.simmons-simmons.com/en/publications/ck0bdr12qo3bz0b33nekzx642/13-china-strengthens-regulation-of-app-stores> (explaining that the CAC requires “[a]pp store operators” to “conduct an authenticity, security and legality review of the app developers whose apps are made available in their stores”).

127. AppInChina, “Making Your Mobile App or Game Compliant With Chinese Law,” <https://www.appinchina.co/services/localization/compliance/> (“Overall, these [Chinese] regulations make it clear that app stores can be held liable for the infringements of the apps on their stores. So think of the app store as your partner, making sure you are complying with local laws. They will audit your app for issues and request the appropriate documents to prove your company is legally registered and able to publish an app in China.”)

display within the Play Store and given that consumers can filter the Apps displayed to them based on the Play Store categories. In addition, Apple's App Store uses a similar set of categories.<sup>128</sup>

66. Dr. Leonard does not dispute any of the evidence supporting my use of App categories but claims incorrectly that "the fact that these categories are used by Google and analysts does not justify their validity or relevance for informing the specific economic question of service rate pass-through."<sup>129</sup> Dr. Leonard does not provide any economic literature or authority to support this incorrect claim, but instead points to cherry-picked examples of Apps that he deems unfit to be classified in the same category, because they don't seem similar enough to him.<sup>130</sup> As I explained in my Merits Report, the logit model allows for differentiation of Apps within a given category.<sup>131</sup> Indeed, it is standard to apply the logit model to markets with differentiated products.<sup>132</sup>

67. Dr. Leonard claims mistakenly that I "considered putting Tinder in both the Lifestyle category and the Dating category and estimated a pass-through rate of [REDACTED] for the former and [REDACTED] for the latter."<sup>133</sup> In fact, recategorizing Tinder from "Lifestyle" to "Dating" has a modest effect on Tinder's estimated pass-through rate (increasing it from [REDACTED] to [REDACTED]).<sup>134</sup> The "Tinder" App is categorized under the "Lifestyle" category in both the Apple App Store and the Play Store.<sup>135</sup>

68. In Exhibit 17 of his report, Dr. Leonard presents a "Summary of Selected Online Platform Service Fees With Service Fee Rates At or Above 30%." Dr. Leonard relies on many of the same unsuitable benchmarks (such as PlayStation, Nintendo, and Kindle Direct Publishing) as the other Google Experts. In Appendix 5, I review the various benchmarks offered by each of the Google Experts and I explain why they are unpersuasive.

69. Dr. Leonard suggests incorrectly that developers' incentives to steer would not put downward pressure on take rates in a more competitive but-for world.<sup>136</sup> According to Dr. Leonard, "nothing prevents a developer advertising lower prices outside Google Play, reaching users through social media or online forums...."<sup>137</sup> Dr. Leonard fails to recognize that, as I explained in my Merits Report, it is the combination of multi-homing *and* steering that would provide (one of

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128. Singer Merits Report ¶¶349-351.

129. Leonard Report ¶66.

130. Leonard Report ¶66.

131. Singer Merits Report ¶351 ("The logit demand model also does not imply that all products in the market are perfectly interchangeable, but instead allows for product differentiation.")

132. Singer Merits Report ¶351, n. 825, citing Gregory Werden & Luke Froeb, *The Effects of Mergers in Differentiated Products Industries: Logit Demand and Merger Policy* 10(2) JOURNAL OF LAW, ECONOMICS, & ORGANIZATION 407, 408 (1994) ("the logit model has direct policy relevance, since the 1992 Horizontal Merger Guidelines use it as the base case for the analysis of mergers in differentiated products industries.")

133. Singer Merits Report ¶351, n. 825, citing Gregory Werden & Luke Froeb, *The Effects of Mergers in Differentiated Products Industries: Logit Demand and Merger Policy* 10(2) JOURNAL OF LAW, ECONOMICS, & ORGANIZATION 407, 408 (1994) ("the logit model has direct policy relevance, since the 1992 Horizontal Merger Guidelines use it as the base case for the analysis of mergers in differentiated products industries.")

134. Singer Merits Report ¶360, n. 851.

135. Singer Merits Report ¶360, n. 851.

136. Leonard Report ¶83.

137. Leonard Report ¶83.

the) economic incentives for developers to share cost savings with consumers in the but-for world.<sup>138</sup> For this competitive mechanism to work, there must be robust competition in the Android App Distribution market, which is absent in the actual world. Moreover, as I explained in my Merits Report, a few developers with critical mass of consumers and widespread name recognition (such as Spotify and Netflix), have, in fact, engaged in indirect steering, through communications outside the App. In a more competitive but-for world, these steering incentives would be much more widespread.

70. Dr. Leonard claims that “Google did not change its service fee rate when rival platform ONE Store entered (in South Korea) and...developers do not tend to offer lower-priced apps on ONE Store, even though ONE Store offers a lower service fee.”<sup>139</sup> But the ONE Store offers only localized competition, whereas many developers (particularly the largest and most economically significant ones) operate globally. It makes economic sense that Google would not respond to localized competition by decreasing its global take rate. Instead, as I explained in my Merits Report, Google has responded to competition from the ONE Store by increasing its direct consumer subsidies to Korean users, thereby decreasing the total cost of the platform in a manner that directly benefits consumers.<sup>140</sup> Record evidence indicates [REDACTED]

[REDACTED] <sup>141</sup> This evidence indicates that [REDACTED].

71. Dr. Leonard claims that developers that would have multi-homed in the but-for world would have incurred additional costs associated with developing and deploying apps to competing App stores.<sup>142</sup> As an economic matter, a competing App store would have clear economic incentives to minimize any incremental costs that developers might incur to list their Apps in that App store. In addition, I understand that Professor Schmidt has found that the technical requirements associated with developing Apps to function in multiple stores are modest. Of course, a large number of developers already deploy their Apps to two stores—the Play Store and the Apple App Store.

72. Dr. Leonard claims that consumers would incur additional search costs in the but-for world because “consumers would have had to spend more time searching to identify the set of apps to download to their phones.”<sup>143</sup> Dr. Leonard provides no compelling evidence that increased competition in the Android App Distribution market would significantly increase consumer search costs. As Dr. Gentzkow emphasizes, a competing App store can be “literally a click away.”<sup>144</sup> In a more competitive but-for world, competing App stores would face clear economic incentives to minimize the any consumer costs of multi-homing.

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138. Signer Merits Report Part VI.A.

139. Leonard Report ¶84.

140. Singer Merits Report ¶377.

141. Korea JoongAng Daily, “One Store gains ground in local Android app market”, (December 2, 2020), <https://koreajoongangdaily.joins.com/2020/12/02/business/industry/One-Store-app-market-Google/20201202175300439.html>.

142. Leonard Report ¶161.

143. Leonard Report ¶159.

144. Gentzkow Report ¶31.

## II. DR. GENTZKOW FAILS TO UNDERMINE MY CONCLUSIONS

73. My Merits Report applied standard antitrust economics to demonstrate that Google has maintained monopoly power in the Android App Distribution Market and in the In-App Aftermarket, and that Google's anticompetitive conduct has resulted in antitrust injury to the Consumer Class. In the Android App Distribution Market, the Challenged Conduct has allowed Google to deny its rivals access to critical inputs necessary to compete effectively. This includes

[REDACTED],<sup>145</sup> and technical barriers restricting alternative distribution methods.<sup>146</sup> Google also

[REDACTED]<sup>147</sup>  
[REDACTED]<sup>148</sup> I also showed that the In-App Aftermarket Tie-In substantially foreclosed competition by excluding rivals from the In-App Aftermarket, preventing the vast majority of developers from switching to a competing In-App Aftermarket rival (or credibly threatening to switch) in exchange for a lower, more competitive take rate.<sup>149</sup> The In-App Aftermarket Tie-In also reinforces foreclosure in the Android App Distribution Market by preventing would-be rivals from expanding from one market to another.<sup>150</sup>

74. As I explain below, Dr. Gentzkow does not engage with the collective effect of Google's anticompetitive restrictions on potential competitors. Instead, he attempts to justify individual elements of the Challenged Conduct on procompetitive grounds in isolation. Below I explain why Dr. Gentzkow's efforts to defend each of these components of the Challenged Conduct are unpersuasive and do not undermine my conclusions.

75. I also explain that Dr. Gentzkow's critiques of my analysis are almost entirely removed from standard antitrust economics. For example, Dr. Gentzkow assumes anticompetitive foreclosure cannot have occurred as long as consumers and developers have "access" to virtually any "alternative" to the Play Store, no matter how remote, inferior, or inefficient these alternative distribution channels may be. To the extent that he engages with the empirical evidence, Dr. Gentzkow champions standards for antitrust immunity so lenient that they would be satisfied under virtually any fact pattern. For example, economists have observed for decades that output and product quality have increased over time in a wide range of high-tech markets, driven by progress in the underlying technologies.<sup>151</sup> Dr. Gentzkow observes similar patterns in this case, he treats it

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145. Singer Merits Report Part IV.A.

146. Singer Merits Report Part IV.A.4.

147. Singer Merits Report Part IV.A.1.

148. Singer Merits Report ¶¶190-191.

149. Singer Merits Report Part V.B.

150. Singer Merits Report ¶249.

151. See, e.g., Ernst Berndt & Neal Rappaport, *Price and Quality of Desktop and Mobile Personal Computers: A Quarter-Century Historical Overview* 91(2) AMERICAN ECONOMIC REVIEW 268 (2001).

as if it were definitive evidence that the Challenged Conduct is procompetitive. Dr. Gentzkow also ignores or minimizes the anticompetitive potential of multi-sided tech platforms.<sup>152</sup>

**A. Dr. Gentzkow Does Not Demonstrate That Google Lacked Monopoly Power in the Relevant Antitrust Markets At Issue During the Class Period**

76. In my Merits Report, I used standard methods routinely employed by antitrust economists to demonstrate that Google has monopoly power in the market for licensed mobile operating systems,<sup>153</sup> in the Android App Distribution Market,<sup>154</sup> and in the In-App Aftermarket.<sup>155</sup> The economic evidence demonstrates Google's monopoly power through direct methods, given Google's proven ability to exclude rivals and to raise prices above competitive levels.<sup>156</sup> Google's monopoly power is also revealed through indirect evidence, using standard metrics such as Google's consistently dominant market shares in the relevant markets at issue.<sup>157</sup>

77. Dr. Gentzkow does not dispute my definition of the relevant antitrust markets at issue,<sup>158</sup> nor does he dispute much of the clear evidence that Google has maintained dominant market shares in each of these relevant markets.<sup>159</sup> In Exhibit 1 of his report, Dr. Gentzkow presents data confirming that the Android OS has accounted for the vast majority of the market for licensable mobile operating systems. To illustrate, Figure 5 below displays data from the same source, excluding feature phones, which are outside the relevant market.

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152. See, e.g., Susan Athey & Fiona Scott Morton, Platform Annexation 84 ANTITRUST LAW JOURNAL (2022) 677, 696-697 [hereafter, Athey & Scott Morton (2022)]; see also Jonathan Baker & Fiona Scott Morton, *Antitrust Enforcement Against Platform MFNs*, 127(7) YALE LAW JOURNAL 2176-2202, 2177 (2017); *Investigation of Competition in Digital Markets: Majority Staff Report and Recommendations*, H.R. Subcomm. on Antitrust, Commercial and Administrative Law of the Comm. on the Judiciary.

153. Singer Merits Report Part I.

154. Singer Merits Report Part II.

155. Singer Merits Report Part III.

156. Singer Merits Report Parts I.C.1; II.C.1; III.C.1.

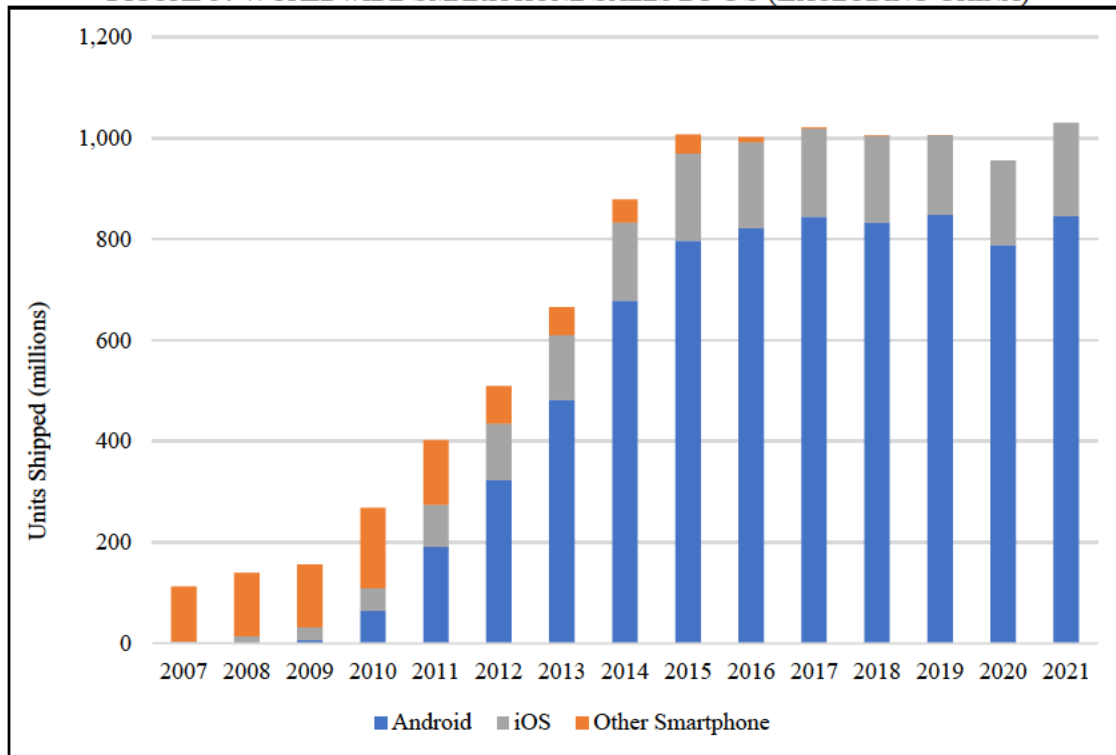
157. Singer Merits Report Parts I.C.2; II.C.2; III.C.2.

158. Gentzkow Report ¶177 (“[A]nalyzing market definition is outside the scope of my assignment[.]”)

159. For example, Dr. Gentzkow presents data confirming that Android accounts for the vast majority of U.S. smartphone sales with licensable software going back at least ten years. Gentzkow Report Appendix C, Exhibit C1.



FIGURE 5: WORLDWIDE SMARTPHONE SALES BY OS (EXCLUDING CHINA)



Sources: IDC Data. Excluded feature phones.

78. Dr. Gentzkow does not even directly dispute that Google has had monopoly power throughout the Class Period. For example, Dr. Gentzkow singles out November 2008 (a month after Android’s launch) as a time when the Play Store “could not plausibly have had significant market power,”<sup>160</sup> but does not make this claim for the Class Period, when Google clearly possessed market power under any reasonable application of standard antitrust methods. Dr. Gentzkow assumes all evidence of severe rival impairment is solely attributable to what he deems Google’s successful “competition on the merits,”<sup>161</sup> without directly disputing the fact that Google has market power (however acquired).

79. Dr. Gentzkow asserts incorrectly that I opined that Google lacked the requisite market power to impose anticompetitive contracts in the Android App Distribution Market during the early years (2008-2009)<sup>162</sup>—a time period when the Android App Distribution Market barely existed.<sup>163</sup> That is not my opinion. Google had an incumbency advantage at the outset of the Android App Distribution Market due to its licensing of the Android operating system and its well-

160. Gentzkow Report ¶510.

161. Gentzkow Report ¶¶229-242.

162. Gentzkow Report ¶36. *Id.* ¶292 (characterizing 2009 as a time when “Android and Android Market were new entrants” lacking monopoly power). *Id.* at ¶510 (characterizing November 6, 2008, “roughly two weeks after the launch of Android Market” as “a time when [Google] could not plausibly have had significant market power.”).

163. The Android App Distribution Market came into existence between 2008 to 2009. The In-App Aftermarket did not exist until in or around 2011. *See, e.g.,* Consumer Class Plaintiff’s First Supplemental Objections and Responses to Defendants’ Third Set of Interrogatories, Response No. 20.

established dominance in search and other mobile functionality such as Google Maps.<sup>164</sup> This incumbency advantage also applied to the licensable mobile OS market, because it gave OEMs clear incentives to enter into MADAs with Google.<sup>165</sup> Dr. Gentzkow also fails to recognize the elementary economic principle reflected in my analysis of Google's early RSAs—that coordination with actual or potential horizontal rivals confers additional market power.<sup>166</sup> In this case, Google used early forms of the Challenged Conduct, such as RSAs with wireless carriers, to extend and enhance its market power by allowing it to ward off competitive entry and expansion by would-be horizontal rivals just as the Android App Distribution Market was starting to take shape.<sup>167</sup>

## **B. Dr. Gentzkow Fails To Demonstrate the Challenged Conduct Is Procompetitive**

80. In this Section, I address Dr. Gentzkow's claims with respect to each element of the Challenged Conduct. As detailed below, Dr. Gentzkow ignores standard antitrust principles, relies on incorrect assumptions, and fails to demonstrate that the Challenged Conduct was necessary to achieve the purported benefits claimed by Dr. Gentzkow. In addition, Dr. Gentzkow's element-by-element approach ignores the coordinated nature and effects of the Challenged Conduct, as I explain in Part II.C.2 below.

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164. Singer Merits Report ¶184 (explaining that Google's strategy included extending its power from search and the associated advertisements into adjacent markets such as app distribution). As I testified, "*Google already had the incumbency advantage*, and it was worried that a mobile operator would invade its space or support a rival app store. And so, it decided to basically to bribe the -- the -- the mobile carriers and did it in a way that caused Google to incur

[REDACTED] Deposition of Hal Singer, PhD (May 12, 2022) [hereafter, Singer Dep.] 271:10-24 (emphasis added). *See also* GOOG-PLAY4-000804641 at -643 (explaining that mobile search "is also crucial in gaining access to users through the Carrier channel (whether through deals with Operators/Carriers - 'push' to consumer - or by creating consumer pull)."); GOOG-PLAY4-000301527 at -549 [REDACTED]

[REDACTED] ; GOOG-PLAY-004456799 at -7117 [REDACTED]

165. Singer Dep. 363:14-364:3 [REDACTED]

*Id.* ¶194, n. 452 (citing GOOG-PLAY-000620996 § 1.1 ([REDACTED])). MADAs from 2009 contain similar language; *see, e.g.*, GOOG-PLAY-000621061-074 ([REDACTED] GOOG-PLAY-001388416-429 ([REDACTED] GOOG-PLAY-001745969-981 ([REDACTED] GOOG-PLAY-000621075-084 ([REDACTED] GOOG-PLAY-000621177-189 ([REDACTED] GOOG-PLAY-001090012-027 ([REDACTED] GOOG-PLAY-001388750-763 ([REDACTED] GOOG-PLAY-000621139-148 ([REDACTED]

166. *See, e.g.*, N. GREGORY MANKIW, PRINCIPLES OF MICROECONOMICS 337-342 (Cengage Learning 8th ed. 2018) [hereafter MANKIW]. *See also* Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines* (2010), §2.1 ("Lessening of Competition Through Coordinated Interaction.")

167. Singer Merits Report ¶¶180-189.

**1. Dr. Gentzkow Fails to Demonstrate that the Restrictions on Creating Even One Non-Google Version of Android in the AFA Are Procompetitive**

81. In my Merits Report, I explained that, although Android is nominally “open-source” software, Google’s AFAs (now ACCs) [REDACTED] OEMs have been effectively prohibited from responding to an exercise in Google Android’s market power by developing a new Android-based OS or by licensing another Android-based OS, such as Amazon’s Fire OS.<sup>168</sup> Google’s AFA contracts [REDACTED]

[REDACTED]<sup>169</sup> [REDACTED]<sup>170</sup> Accordingly, the early AFAs worked in concert with other elements of the Challenged Conduct to entrench Google’s monopoly in the market for licensable mobile OSs.

82. Dr. Gentzkow claims that Google’s ACCs (and AFAs) “enhance the value of the Android ecosystem by aligning the incentives of OEMs to limit fragmentation and to deliver a consistent and high-quality out-of-the-box experience to users.”<sup>171</sup> But Dr. Gentzkow does not explain why it is procompetitive for Google to [REDACTED]

[REDACTED] Dr. Gentzkow provides no credible evidence that having two (rather than one) licensable mobile OSs available to OEMs, consumers, and developers would result in chaotic fragmentation. [REDACTED]

[REDACTED]<sup>174</sup> A forked device would compete under a separate operating system, distinct from Google Android. Dr. Gentzkow also ignores that an OEM faces clear economic incentives to provide the best possible customer experience and would not rationally encumber its devices (or consumers) with a low-quality mobile OS that would harm its own profitability.

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168. Singer Merits Report ¶¶17-18; ¶¶60-61; ¶¶192-193.

169. See GOOG-PLAY4-007852650 at -651 ([REDACTED])

170. Singer Merits Report ¶193.

171. Gentzkow Report ¶248.

172. Without a successful “Fire Phone,” Amazon was less likely to fully compete in the Android App Distribution Market by investing and developing a mobile App store that would rival the Play Store in scope and reach. Singer Merits Report ¶198.

173. Gentzkow Report ¶130.

174. Gentzkow Report ¶ 265 & n. 379.



83. Dr. Gentzkow also claims that, [REDACTED] I have responded to this claim in Part II.A above.

## 2. Dr. Gentzkow Fails to Demonstrate that the MADAs Are Procompetitive

84. In my Merits Report, I explained that Google's MADAs require distribution and prominent placement of the Play Store by obliging OEMs to pre-install all of the GMS suite (Google Search, Play Store, Maps, Chrome, Gmail, and YouTube) or none of it. OEMs must also sign a MADA in order to access critical APIs so that applications can work. Although the MADAs do not prevent OEMs from preloading alternative App stores, they require the OEMs to load the Play Store on the default home screen.<sup>175</sup> They leverage Google's market power in the GMS suite to ensure that the Play Store will always appear on the default home screen, making it impossible for rivals to displace the Play Store. Dr. Gentzkow disputes that the MADAs actually require the Play Store to receive more prominent placement than other App stores.<sup>176</sup> However, Dr. Gentzkow does not dispute my conclusion, well-established in the behavioral economics literature [REDACTED] that the way in which choices are presented to consumers can significantly influence consumer behavior.<sup>177</sup> Because OEMs must distribute the Play Store on the default home screen, the MADAs effectively secure for the Play Store a prominent position across every single GMS device.

85. Dr. Gentzkow claims that I "suggest[] that OEMs are 'required to sign [MADA] contracts,'" and claims that "no OEM is required to sign a MADA."<sup>178</sup> Although an OEM could theoretically refuse to sign a MADA, virtually every manufacturer of an Android mobile device worldwide (excluding China) agrees to a MADA out of economic necessity. Doing so is necessary to gain access both to GMS and to APIs that are critical for a great majority of Android Apps to function; Google's migration of key APIs into GMS has effectively ensured that OEMs will agree to the MADA to have a functioning Android mobile device.<sup>179</sup> Dr. Gentzkow's report presents compelling evidence that Huawei's inability to enter into a MADA (due to U.S. government restrictions) crippled its smartphone business outside of China.<sup>180</sup> The Huawei example relied upon

175. Singer Merits Report ¶¶194-197.

176. *See, e.g.*, Gentzkow Report ¶273. I understand that the question of whether the MADAs actually required the Play Store to receive more prominent placement than other App stores is ultimately a dispute to be resolved by the fact finder, and not the experts.

177. Singer Merits Report ¶20; ¶¶196-197. *See also* Comscore, *The 2016 U.S. Mobile App Report*, slide 38, <https://www.comscore.com/Insights/Presentations-and-Whitepapers/2016/The-2016-US-Mobile-App-Report>, (documenting a "strong correlation between home screen position and how often an app gets used").

178. Gentzkow Report ¶273.

179. Schmidt Report ¶ 39 ("With its inclusion of GMS, Google has effectively created an entirely new platform that is incompatible with AOSP."). GOOG-PLAY-000128863.R at 876.R ([REDACTED]).

180. Gentzkow Report ¶277. As a research report cited by Dr. Gentzkow explains, "Huawei told us that its smartphone sales revenue dropped [materially for both smartphones and tablets] between 2019 and 2020. According to Huawei, this was primarily attributable to the lack of availability of apps that rely on Google Mobile Services on newer models of Huawei smartphones and tablets – these apps were not available as from May 2019 Google Mobile Services could not be pre-loaded on these Huawei devices nor downloaded after purchase." *Mobile Ecosystems: Market Study Interim Report*, Competition and Markets Authority, ¶3.177 (Dec. 14, 2021),

by Dr. Gentzkow demonstrates that OEMs have no economically viable alternative but to license GMS and preload it on their Android phones.

86. Dr. Gentzkow claims that the MADA “provides OEMs incentives to guarantee a clean, consistent, and high-quality out-of-the-box experience for users, thereby strengthening the Android brand.”<sup>181</sup> But OEMs, whose profits depend critically on users’ willingness to pay for the device in the box, have clear economic incentives to provide users with a high-quality experience. Dr. Gentzkow claims that “[i]f a user buys a device bearing the Android trademark that does not have the preinstalled apps she expects, or if the Google Apps on her device do not function correctly, this will likely impact her perception of Google and Android more broadly.”<sup>182</sup> The same could be said of OEMs. For example, if a Samsung device does not come included with the out-of-the-box functionality expected and valued by the user, this will likely have a negative effect on the consumer’s perception of Samsung more broadly. Dr. Gentzkow cites evidence that OEMs choose to preinstall GMS Apps “because of the value they provide,” even when they are not required to do so by the MADA.<sup>183</sup> This undermines Dr. Gentzkow’s claim that OEMs would be disincentivized to deliver value to users in the absence of the MADAs and suggests that the MADAs instead had the effect of giving preferential placement of the Play Store relative to other App stores.

87. Dr. Gentzkow reviews evidence which “suggests that having the GMS apps preinstalled is what a large majority of users want and expect.”<sup>184</sup> If that is the case, then Google does not need to impose contractual restrictions on OEMs requiring them to distribute the entire suite of GMS apps. OEMs have clear economic incentives to offer devices that include functionality that users want and expect. In any event, this claim highlights Google’s leverage. Because users expect some of the GMS suite of Apps, Google is able to require the OEMs to install *every* App within that suite, including the Play Store. In addition, as a result of the terms of the MADAs, OEMs are unable to exercise their own judgment as to whether or not users would prefer to have an alternate App store appear on the default home screen rather than Google Play. Because the MADAs require the Play Store to appear on every single default home screen, no other App store can vie for more prominent placement than Google. This is true regardless of how much the alternative App store might be willing to pay.<sup>185</sup>

88. Dr. Gentzkow claims that “the specific MADA provision that offers the suite of Google’s apps as a group is essentially a barter through which Google licenses valuable intellectual property at a price of zero in exchange for OEMs preconfiguring these devices in specific ways

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1048746/MobileEcosystems\\_InterimReport.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1048746/MobileEcosystems_InterimReport.pdf).

181. Gentzkow Report ¶275.

182. Gentzkow Report ¶280.

183. Gentzkow Report ¶312.

184. Gentzkow Report ¶276.

185. In my Merits Report, I explained that “[t]he MADAs prevented an OEM from customizing the Apps on mobile devices by precluding an alternative bundle comprised of a rival App store (including Amazon’s App store) *alongside* Google’s other popular (non-Play Store) Apps—that is, a rival App store would need to compete across every dimension of Google’s App suite at once, effectively raising its costs.” Singer Report ¶198. This would not necessarily preclude the Play Store from being included in the GMS suite; it would simply allow for the Amazon App Store to be placed as the sole App Store on the Default Home Screen.

that provide value to Google...and providing wider distribution of apps that generate revenue for Google.”<sup>186</sup> According to Dr. Gentzkow, “[w]ithout the requirement that OEMs preinstall the full suite of GMS apps, some OEMs could choose to obtain the benefits of the free intellectual property by taking apps they perceive to be most valuable while foregoing other apps that are important for Google to obtain its value in exchange.”<sup>187</sup> In fact, Google’s all-or-nothing bundling of the GMS suite is anticompetitive because an equally efficient competitor could not profitably compete with it: There is no amount of money that a competing App store could offer an OEM that would provide sufficient compensation for the OEM to preinstall the competing App store instead of (or more prominently than) the Play Store.<sup>188</sup> Google’s intellectual property is licensed for “free” because doing so allows Google to extract supracompetitive profit in the Android App Distribution Market and the In-App Aftermarket.<sup>189</sup>

89. Dr. Gentzkow claims that “the MADA provides direct incentives to OEMs to install system updates in a timely manner,” improving device security.<sup>190</sup> According to Dr. Gentzkow, “OEMs’ own incentives to install software updates may not be aligned with what creates the most value for the platform as a whole.... Google Play services, which is part of the suite of apps and services licensed under the MADA...helps circumvent this issue by providing a means of updating Google apps and apps installed from Google Play, even if the device has not been updated by the OEM.”<sup>191</sup> This claim is irrelevant because I understand Consumer Plaintiffs are not challenging Google’s requirement for security updates.

90. Dr. Gentzkow claims that the MADA is procompetitive because it was introduced in 2009, when Android and Android Market were new entrants, and therefore could not have been exercising market power. I have responded to this claim in Part II.A above. Additionally, while Dr. Gentzkow argues that “the structure of the MADA has remained largely unchanged since,”<sup>192</sup> he fails to recognize that the balance of content in GMS as compared to AOSP has changed significantly since 2009. Over time, Google has migrated core API and App functionality into GMS rather than AOSP.<sup>193</sup>

91. Dr. Gentzkow claims that the MADA is procompetitive because “[o]ther platforms that had limited market penetration and could not reasonably be considered to have monopoly power also required or implemented preinstallation of a full suite of platform-sponsored apps on

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186. Gentzkow Report ¶285.

187. Gentzkow Report ¶285.

188. Singer Merits Report ¶246.

189. Dr. Gentzkow claims that “When Google was required by the European Commission to offer Search and Chrome separately from other GMS apps, they...charg[ed] OEMs a substantial licensing fee for the ‘core’ apps Gmail, Maps, YouTube, and Google Play. Features of the smartphone production industry suggest that this will tend to raise the price that users ultimately pay for device.” Gentzkow Report ¶286. Dr. Gentzkow provides no evidence that device prices in Europe increased as a result. In addition, I understand that any purported “offsets” outside the relevant market are not relevant here. See Ted Tatos & Hal Singer, *The Abuse of Offsets as Procompetitive Justifications: Restoring the Proper Role of Efficiencies after Ohio v. American Express and NCAA v. Alston* 38(4) GEORGIA STATE UNIVERSITY LAW REVIEW (2022), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4113547](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4113547).

190. Gentzkow Report ¶287.

191. Gentzkow Report ¶288.

192. Gentzkow Report ¶292.

193. Schmidt Report ¶¶ 32- 35.

their devices.”<sup>194</sup> But Dr. Gentzkow does not present any evidence that any of the platforms he listed *required* preloading of platform-sponsored apps. Rather, each of the devices discussed by Dr. Gentzkow—the Amazon Fire Phone, the Windows Lumia 950, and the Blackberry Z10—were manufactured by the platform provider.<sup>195</sup> That some OEMs lacking monopoly power chose to preload their own apps does not demonstrate that it is procompetitive for Google to require OEMs to make it impossible for rivals to displace the Play Store. Moreover, Dr. Gentzkow ignores that conduct may be anticompetitive when undertaken by a firm with monopoly power, even if it is not anticompetitive when undertaken by a competitive firm.<sup>196</sup>

92. Dr. Gentzkow claims that “OEMs not only can but do preinstall and prominently display alternative app stores.”<sup>197</sup> But the MADAs did not need to restrict pre-installation in order to be anticompetitive. As explained above, the MADAs leverage Google’s market power in the GMS suite to ensure that the Play Store will always appear on the default home screen, making it impossible for rivals to displace the Play Store. The best a would-be rival could achieve would be side-by-side with Google Play. Given Google’s incumbency advantage, would-be rivals face clear disincentives to compete for that privilege. And when Google has been faced with potential competitors with both the resources to achieve pre-installation and an established user base (such as Facebook), Google has deployed measures to restrict their ability to compete and incentivized them not to compete in the Android App Distribution Market.<sup>198</sup>

93. In my Merits Report, I explained that Google’s all-or-nothing bundling of the GMS suite can be shown to be anticompetitive under the “discount attribution test,” or the *Cascade* test.<sup>199</sup> Dr. Gentzkow critiques my application of the discount attribution test. First, he asserts that the OEM gives up nothing if it preinstalls a rival App store, so that there is no penalty or foregone discount.<sup>200</sup> This is not the relevant comparison. If the OEM were to preinstall a rival App store and place it on the default home screen in place of the Play Store, it would incur the immense penalty of losing access to the entire GMS suite. An equally efficient rival App store could not compensate the OEM for this penalty and still earn a profit. Therefore, no equally efficient rival App store can outbid Google for *preferred* placement.

94. Dr. Gentzkow then incorrectly states that the discount attribution test is not applicable because “it would require assuming that Google Play and rival app stores are indistinguishable from consumers’ perspective.”<sup>201</sup> Dr. Gentzkow is wrong. The discount attribution test is not performed with respect to an actual competitor (such as the Amazon App Store), but rather a *hypothetical* equally efficient rival, which by definition would offer the same selection of Apps at the same cost as the Play Store.

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194. Gentzkow Report ¶¶293-294.

195. Gentzkow Report ¶ 293 and sources cited therein.

196. See, e.g., Douglas Bernheim and Randal Heeb, *A Framework for the Economic Analysis of Exclusionary Conduct*, OXFORD HANDBOOK OF INTERNATIONAL ANTITRUST ECONOMICS, Vol. 2 (2014) at 30.

197. Gentzkow Report ¶¶296-297.

198. Singer Merits Report ¶¶231-237.

199. Singer Merits Report ¶246.

200. Gentzkow Report ¶308.

201. Gentzkow Report ¶309.



95. Dr. Gentzkow further claims incorrectly that the discount attribution test is not applicable because it assumes that the firm engaging in anticompetitive bundling has market power in the tied product; in other words, Dr. Gentzkow disputes the notion that Google has monopoly power in the GMS suite.<sup>202</sup> In fact, Google's market power in GMS Apps such as Google Search, Maps, Gmail, and YouTube is well established.<sup>203</sup> Moreover, Google has monopoly power in the market for licensable mobile operating systems. As explained by Dr. Schmidt, key portions of Google Android are contained within the GMS suite because the GMS APIs are crucial for Apps to run on the Android operating system.<sup>204</sup> And as Dr. Gentzkow acknowledges, the trademark to the Android operating system is also bundled as part of the MADA.<sup>205</sup> Dr. Gentzkow's Exhibit 30 provides compelling direct evidence of Google's monopoly power.<sup>206</sup>

### 3. Dr. Gentzkow Fails to Demonstrate that the Early RSAs Were Procompetitive

96. As I explained in my Merits Report, Google's RSAs were part of a long-term strategy that allowed Google to achieve dominance and engage in anticompetitive exclusionary conduct by impairing competitive entry and expansion by would-be horizontal rivals in the Android App Distribution Market.<sup>207</sup> Google's early RSAs were predatory because [REDACTED]

[REDACTED]<sup>208</sup>

97. Dr. Gentzkow incorrectly characterizes the early RSAs as "form of penetration pricing that helped coordinate early adoption of the Android Market platform," and appeals to the literature on two-sided platforms to support his claim.<sup>209</sup> In fact, the literature does not support his claim. *First*, to support his incorrect claims on predation, Dr. Gentzkow cites to economic literature stating that "tests [for predation] are motivated by the standard theoretical result that profit-maximizing prices are never below marginal cost. But for multisided platforms, as a matter of theory, the profit-maximizing price to one or more sides (*though not, of course, to all*) could be lower than marginal cost..."<sup>210</sup> In other words, below-cost predatory pricing is not economically justified on a platform-wide basis. Thus, even assuming counterfactually that developers in the early years had paid only Google's initial take rate of [REDACTED], the early RSAs would still have been predatory because the total price to both sides of the market (developers and consumers) would have been below marginal cost: [REDACTED]

202. Gentzkow Report ¶¶302-306.

203. Singer Merits Report ¶194.

204. Schmidt Report ¶ 39 ("With its inclusion of GMS, Google has effectively created an entirely new platform that is incompatible with AOSP ... Apps that are written for Google Android with GMS are not compatible with AOSP Android").

205. Gentzkow Report ¶ 265 & n.379.

206. Dr. Gentzkow's Exhibit 30 shows Huawei's share of new smartphones sold worldwide (excluding China) falling off rapidly after the OEM was denied access to GMS due to an executive order. *See also* Gentzkow Report ¶277, n. 425 (citing a research report according to which the absence of GMS was a significant factor in the perception of success of Huawei's products by customers.)

207. Singer Merits Report Part IV.A.

208. Singer Merits Report ¶¶178-179.

209. Gentzkow Report ¶¶98-99.

210. Gentzkow Report ¶361, citing David Evans and Richard Schmalensee, *The Antitrust Analysis of Multisided Platform Businesses* OXFORD HANDBOOK OF INTERNATIONAL ANTITRUST ECONOMICS 404, 433 (2014) (emphasis added).

[REDACTED] *Second*, for the claim to be economically plausible, it would have to be the case that the revenue-sharing payments were used to lower the price of the Play Store to developers (and/or consumers). Subsidizing developers could entice more consumers to the Play Store, and vice-versa. But as I explained in my Merits Report, it did neither; [REDACTED]

[REDACTED] <sup>211</sup> Dr. Gentzkow is therefore incorrect to draw an analogy between the Play Store and “shopping malls that often subsidize the rent of large tenants early on, then reduce or eliminate that subsidy once the mall has attracted a steady stream of customers.”<sup>212</sup> The developers’ “rent” was not subsidized by the RSAs, nor were consumer prices.

98. Dr. Gentzkow suggests that “revenue-sharing payments will tend to reduce the price that users ultimately pay for devices and service from MNOs” but provides no quantification of the impact of such a price cut.<sup>213</sup> Even assuming that there was a device price cut, it would have been outside the relevant markets at issue here and would not have affected the App prices developers set or consumers pay within the Play Store. [REDACTED]

99. Dr. Gentzkow suggests “that revenue-sharing payments will increase MNOs’ incentives to invest in configuring Android devices in ways that increase user value” but provides no evidence that the RSAs incentivized carriers to make investments that benefitted consumers, as opposed to Google.<sup>214</sup> Nor does he provide any evidence on the nature or economic significance of any such investments. Even assuming that the RSAs caused economically significant investments to “promote Android devices,” Dr. Gentzkow does not explain why the RSA payments [REDACTED]. Put differently, Dr. Gentzkow does not explain why these purported procompetitive benefits could not have been achieved without predation. Moreover, any such investments would be outside the relevant markets at issue here, and would not subsidize developers or consumers within the Play Store.

100. Dr. Gentzkow allows for the possibility that “the early RSAs did contribute to some MNOs or OEMs deciding to forego the option of creating their own separate app stores,” but claims that “this would have provided another significant benefit to Android platform participants by limiting fragmentation into walled garden app stores.”<sup>215</sup> I respond to Dr. Gentzkow’s incorrect claims regarding fragmentation in Part II.C.3.

101. Dr. Gentzkow claims incorrectly that the early RSAs were not predatory because “[p]ayments to MNOs cannot be predation directed at MNOs since the net effect of these payments

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211. Singer Merits Report ¶¶177-178.

212. Gentzkow Report ¶100.

213. Gentzkow Report ¶325.

214. Gentzkow Report ¶326.

215. Gentzkow Report ¶331.



is to increase rather than decrease the MNOs' profits."<sup>216</sup> But as Dr. Gentzkow concedes (correctly), predation "refers to a firm setting a price...that is profitable only because it drives one or more current or potential competitors out of the market."<sup>217</sup>

As a source relied upon by Dr. Gentzkow confirms,

<sup>218</sup> The early RSAs satisfy this definition of predation.

102. Dr. Gentzkow does not dispute the evidence showing that,

<sup>219</sup> Dr. Gentzkow claims instead that . Specifically, Dr. Gentzkow claims that the early RSAs were profitable even in the short run because

<sup>220</sup> This may well be correct—indeed, it is consistent with the conclusion that charging a substantially lower take rate in a more competitive but-for world would not cause Google to offset the lost revenue by charging even a modest fee on consumers,<sup>221</sup> or by taking other measures to cut costs by reducing the scope, quality, or security of services provided by the Play Store. However, predation is properly assessed from the perspective of an equally efficient competitor in the Android App Distribution Market, not a cross-market competitor. As a result, any such offsets do not negate my conclusion that the RSAs were predatory within the Android App Distribution Market.<sup>222</sup>

103. Elsewhere, Dr. Gentzkow claims that "low introductory prices are fully consistent with competition and efficiency" and that other firms that "have in fact introduced app or game stores that incurred losses for a number of years."<sup>223</sup> Dr. Gentzkow ignores the difference between the type of up-front sunk costs and fixed costs that characterize technology investments and ongoing marginal costs that are the subject of predation here. Given that

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216. Gentzkow Report ¶¶359-360. Even if one were to credit Dr. Gentzkow's response, this argument does nothing to undermine the fact that the revenue share agreements also made it unprofitable for third-party stores to acquire the right to preloading on carriers' phones.

217. Gentzkow Report ¶359.

218. Gentzkow Report ¶359, n. 569 (citing Nicola Giocoli, *Games Judges Don't Play: Predatory Pricing and Strategic Reasoning in US Antitrust*, 21(1) SUPREME COURT ECONOMIC REVIEW 271, 302 (2013)).

219. Gentzkow Report ¶361.

220. Gentzkow Report ¶361(c) (emphasis in original).

221. Singer Merits Report ¶¶401-404.

222. See, e.g., Ted Tatos & Hal Singer, *The Abuse of Offsets as Procompetitive Justifications: Restoring the Proper Role of Efficiencies after Ohio v. American Express and NCAA v. Alston* 38(4) GEORGIA STATE UNIVERSITY LAW REVIEW (2022).

223. Gentzkow Report ¶361(a),(d).

[REDACTED], an equally efficient rival could not have competed profitably even if it had incurred the sunk and fixed costs necessary to deploy its own App store.

104. Dr. Gentzkow claims incorrectly that I do not establish that Google [REDACTED] Google's pricing was predatory because [REDACTED] t. As I explained in my Merits Report, the Play Store has become highly profitable over the long run, as Google has increased the percentage of each transaction it retains to 30 percent in most cases. This take rate is supracompetitive, allowing Google to earn monopoly profit.<sup>225</sup>

#### 4. Dr. Gentzkow Fails to Demonstrate that the Later RSAs Were Procompetitive

105. Dr. Gentzkow claims that the Google's later RSAs, which he defines as "typically those signed in 2014 or later, and generally referred to by Google as [REDACTED]"<sup>226</sup> were procompetitive for some of the same reasons he claims that the early RSAs were procompetitive.<sup>227</sup> I respond to these claims in Part II.B.3 above.

106. As explained in Part II.C.1, Google has deployed Premier Tier RSAs, which explicitly prohibit preinstallation of competing App stores, to ward off new potential competition in the Android App Distribution Market. Dr. Gentzkow acknowledges that the Premier Tier RSAs [REDACTED].<sup>228</sup>

107. Dr. Gentzkow claims that the Premier Tier RSAs are "analogous to Coke offering McDonald's a discount off the regular wholesale price of its products in exchange for McDonald's featuring and promoting Coke products prominently and/or exclusively in their stores."<sup>229</sup> This economic analogy does not support Dr. Gentzkow's claim. Dr. Gentzkow ignores that Coke would presumably need to compete for the right to exclusivity with at least one similarly situated rival (Pepsi). In this case, there is no Pepsi to compete with Google's Coke. In a more competitive but-for world, a rival such as Amazon would play the role of Pepsi. More generally, Dr. Gentzkow has no basis to assume that exclusive distribution arrangements involving major soft drink brands are automatically procompetitive; they may be, but the answer depends on questions of market power. For example, if Coke merged with Pepsi to form a soft drink monopoly, it might be able to impose anticompetitive exclusive arrangements on retailers that would substantially foreclose competition in the soft drink market.<sup>230</sup>

108. More fundamentally, no other equally efficient App store could *ever* secure the terms that Google has secured for itself in the RSA 3 Premier Tier agreements because Google

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224. Gentzkow Report ¶361(e).

225. Singer Merits Report ¶183.

226. Gentzkow Report ¶365.

227. He claims that the later RSAs "will tend to lead to lower device prices," and that they increase "the incentives of OEMs and MNOs to invest in and support the Android platform." He also claims that the later RSAs "provide incentives to update devices in a timely manner." Gentzkow Report ¶376.

228. Gentzkow Report ¶377.

229. Gentzkow Report ¶377.

230. See, e.g., Steven Salop, *The Raising Rivals' Cost Foreclosure Paradigm, Conditional Pricing Practices, and the Flawed Incremental Price-Cost Test* 81(2) ANTITRUST LAW JOURNAL 371 (2017).

[REDACTED]

To extend the analogy above, Pepsi would not have the option of bidding for exclusive placement within McDonalds.

109. Dr. Gentzkow claims that the Premier Tier RSAs “provide incentives to OEMs and MNOs to create a clean, consistent, and high-quality out-of-the-box experience for users that strengthens the Android brand.”<sup>231</sup> I have responded to this claim in Part II.B.2 above. Relatedly, Dr. Gentzkow asserts that the Premier Tier RSAs “have a clear procompetitive rationale” because, he claims, they help to limit “bloatware.”<sup>232</sup> To support his claim, Dr. Gentzkow conflates preinstallation of a competing App store with all manner of unrelated software. For example, he references a 2012 paper describing bloatware as “pages and pages of applications that we had no need for. There were more than 60 applications for services, games, and tools that we didn’t want.”<sup>233</sup> Separately, Dr. Gentzkow relies on a 2020 document from Privacy International expressing concern regarding “devices that contain pre-installed apps that cannot be deleted (often known as ‘bloatware’), which can leave users vulnerable to their data being collected, shared, and exposed without their knowledge or consent.”<sup>234</sup> Taken as a whole, the “bloatware” evidence reviewed by Dr. Gentzkow suggests that the Challenged Conduct has not been particularly effective in delivering the “consistent, and high-quality out-of-the-box experience” that Dr. Gentzkow claims it does. In any case, Dr. Gentzkow does not explain why “bloatware” could not be addressed without prohibiting the preinstallation of any competing App store.

110. After defending the Premier Tier RSAs as purportedly critical to ensuring a high-quality user experience, Dr. Gentzkow then proceeds to defend them by claiming that they are actually not all that common.<sup>235</sup> Yet Dr. Gentzkow’s own Exhibit 34 shows that [REDACTED]. As explained in Part II.B.1 above, [REDACTED]

111. Dr. Gentzkow claims that the Premier Tier RSAs provide incentives “to limit app store fragmentation.”<sup>236</sup> I respond to Dr. Gentzkow’s incorrect claims regarding fragmentation in Part II.C.3.

## 5. Dr. Gentzkow Fails to Demonstrate that Project Hug Is Procompetitive

112. As I explained in my Merits Report, Google’s Project Hug impaired entry and expansion by competing App stores. Project Hug secured content from some of the largest developers, which precluded them from offering competing App stores the exclusive content necessary to help drive usage; Project Hug also imposed content parity requirements for certain

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231. Gentzkow Report ¶376.

232. Gentzkow Report ¶¶377-390.

233. Gentzkow Report ¶382, citing Patrick McDaniel, *Bloatware Comes to the Smartphone* 10(4) *IEEE Security & Privacy* (2012) at 85-87.

234. Gentzkow Report ¶386, citing Privacy International, *An Open Letter to Google*, (January 8, 2020), <https://privacyinternational.org/advocacy/3320/open-letter-google>.

235. Gentzkow Report ¶¶396-400; ¶419.

236. Gentzkow Report ¶376.



developers. Project Hug is anticompetitive through the standard economic lens of an MFN imposed by a dominant platform.<sup>237</sup>

113. Dr. Gentzkow claims that that economic literature suggests that MFNs can be efficient under some circumstances,<sup>238</sup> but ignores that the 2013 article he cites explains that MFNs are more likely to raise anticompetitive concerns when they are adopted by firms with substantial market power, as is the case here.<sup>239</sup> Moreover, he ignores the more recent and relevant 2018 article that helped to frame my analysis, which deals specifically with online platforms such as the Play Store; the authors conclude they are “skeptical” that efficiency justifications for platform MFNs “will routinely prevail.”<sup>240</sup>

114. Dr. Gentzkow claims that Project Hug’s “sim-ship” requirements “are a simple and low-cost way to agree that, in exchange for the valuable services and discounts Google provides, an app developer will offer its future apps on Google Play in a timely manner and in full-featured versions.”<sup>241</sup> This ignores that Project Hug, like all MFNs, consists of contracts that reference rivals, whose potential for anticompetitive harm is well established among antitrust practitioners.<sup>242</sup> In this case, Project Hug [REDACTED]

[REDACTED] As the dominant incumbent, the Play Store is

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237. Singer Merits Report Part IV.A.3.b. See also Jonathan B. Baker & Fiona Scott Morton, *Antitrust Enforcement Against Platform MFNs*, 127(7) YALE LAW JOURNAL 2176-2202 (2018) [hereafter, Baker & Scott Morton (2018)].

238. Gentzkow Report ¶454, citing Steven Salop & Fiona Scott Morton, “Developing an Administrable MFN Enforcement Policy,” *Antitrust* 15-19 (2013), at 15 [hereafter, Salop & Scott Morton (2013)].

239. Salop & Scott Morton (2013) at 18. Another article cited by Dr. Gentzkow explains that “MFNs may also harm competition by assisting an incumbent in foreclosing the entry or expansion of rivals.” Jonathan Baker & Judith Chevalier, *The Competitive Consequences of Most-Favored-Nation Provisions* 27(2) ANTITRUST 20, 24 (2013) (cited in Gentzkow Report ¶456).

240. Baker & Scott Morton (2018) at 2183. Dr. Gentzkow claims he is “not aware of any model of an MFN involving the kinds of timing and quality provisions at issue in Project Hug.” Gentzkow Report ¶454, n. 739. Here, Project Hug raised the quality-adjusted price of content available to developers, consistent with the literature. Baker & Scott Morton (2018) at 2185, n. 28 (reviewing a study in which an online platform responded to an MFN ban by “introducing quality improvements to the service it provided...suggesting online platform competition increased when platform MFNs were banned”). According to antitrust economist Fiona Scott-Morton (formerly of the DOJ Antitrust Division) “a contract between a buyer and a seller may refer to, and its terms may depend on, information outside the buyer-seller relationship: information from other transactions to which those same firms are party. Those references may be either explicit or implicit, and they can involve a host of factors, including price terms, non-price terms, terms pertaining to the buyer’s rivals, or terms pertaining to the seller’s rivals. I call these Contracts that Reference Rivals, or CRR.” Fiona Scott-Morton, *Contracts that Reference Rivals*, Georgetown University Law Center (2012), at 2 [hereafter, Scott Morton (2012)]. MFNs are CRRs because they “typically result in the covered buyer knowing its rivals’ prices (or other provisions of the contract) are no higher than its own.” *Id.* at 3.

241. Gentzkow Report ¶455.

242. See, e.g., Scott-Morton (2012) at 2 (“[T]he economics literature has identified many circumstances where CRRs [contracts that reference rivals] have the potential to harm consumers and competition, particularly...when they involve firms with market power. CRRs have thus been, and will continue to be, the subject of antitrust scrutiny, both at the government and in private litigation.”) See also *id.* at 5. (“The economic literature indicates that the settings where CRRs are most likely to harm consumers and competition involve dominant firms possessing market power and a high market share.”).

uniquely positioned and incentivized to impose MFNs that foreclose competition from would-be rivals in the Android App Distribution Market.<sup>243</sup>

115. Dr. Gentzkow suggests incorrectly that the anticompetitive effects of MFNs are “generally focused” on “tacit collusion among sellers,” and suggests that the exclusion of rivals is an “alternative theory.”<sup>244</sup> In fact, economists recognize anticompetitive exclusions as one of the primary forms of anticompetitive harm associated with MFNs.<sup>245</sup>

## **6. Dr. Gentzkow Fails to Demonstrate that Google’s Unnecessary Technical Barriers Are Procompetitive**

116. I explained in my Merits Report that Google has impaired competition in the Android App Distribution Market by imposing unnecessary technical barriers, including default settings and warnings that make it unnecessarily difficult and cumbersome for users to download rival App stores and to sideload Apps. Google has also historically restricted auto-updating capabilities for Apps not listed in the Play Store or App stores pre-installed by OEMs. My opinions on technical barriers depend on the findings of Plaintiffs’ technical expert, Professor Schmidt, who finds that Google’s technical barriers exceeded what would have been necessary for security purposes.<sup>246</sup> Dr. Gentzkow also claims, relying on Dr. Qian’s report, that less restrictive security restrictions would be more costly, but I understand that Dr. Schmidt’s analysis shows that would not be the case.<sup>247</sup>

117. Dr. Gentzkow claims “[s]ecurity is a key feature demanded by users,” and cites evidence and testimony to this effect.<sup>248</sup> The relevant question is not whether users value security—to my knowledge, no expert in this case has claimed otherwise—but rather whether Google imposed barriers that were unnecessary from a technical perspective. I understand that Professor Schmidt has found that Google did so.

118. Dr. Gentzkow claims that “[t]he challenged conduct related to security has also not foreclosed access to apps via direct downloads.”<sup>249</sup> As I explain above, Dr. Gentzkow’s claim that any form of “access” proves that foreclosure did not occur is divorced from standard antitrust economics. In addition, the data relied upon by Dr. Gentzkow show that the current “Unknown Sources” restrictions substantially limit the reach of any competitor subject to those restrictions. Dr. Gentzkow’s statistics show that [REDACTED] [REDACTED] have not enabled permissions for even one app to download from unknown sources.<sup>250</sup>

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243. *Id.* See also Baker & Scott Morton (2018) at 2181 (“A platform MFN imposed by an incumbent OTA could prevent these outbreaks of competition”)

244. Gentzkow Report ¶¶457-458.

245. Baker & Scott Morton (2018) at 2180.

246. Singer Merits Report Part IV.A.4. Likewise, although Dr. Gentzkow claims that “other platforms adopt similar safeguards,” Gentzkow Report ¶478, I understand that Dr. Schmidt shows that Google’s technical barriers are materially different from those on the platforms Dr. Gentzkow claims are analogous. *See, e.g.*, Schmidt Report ¶ 107 (“Other mechanisms exist to easily verify not only the identity of the developer, but also to validate the authenticity and safety of the app,” using Windows as an example).

247. Gentzkow Report ¶489.

248. Gentzkow Report ¶¶470-475.

249. Gentzkow Report ¶483.

250. Gentzkow Report ¶485 and Exhibit 37.

These data support the conclusion that Google’s “Unknown Sources” restrictions foreclose competing app stores from reaching a substantial portion of consumers.

119. Dr. Gentzkow claims “challenged conduct related to security also enables Google to offer users informed choice.”<sup>251</sup> He does not explain why requiring a series of ominous warnings even for reputable App stores such as the Amazon App Store makes users better informed, as opposed to causing users to conflate reputable App stores with “[m]alware and other harmful downloads.”<sup>252</sup>

## **7. Dr. Gentzkow Fails to Demonstrate that Google’s Developer Distribution Agreements Are Procompetitive**

120. In my Merits Report, I explained that Google’s developer distribution agreements (“DDAs”) impair competition from rivals in the Android App Distribution Market because they forbid distribution of competing App stores through the Play Store, and because they ban developers from steering users to lower-priced App distribution channels or from using user information learned through the Play Store.<sup>253</sup>

121. Dr. Gentzkow claims that removing these restrictions “would encourage free riding that would likely degrade the long-run quality of the Android platform.”<sup>254</sup> Dr. Gentzkow’s claim is unsupported by any evidence. As explained in my Merits Report, Google would continue to serve 60 percent of the Android App Distribution Market in the but-for world;<sup>255</sup> Google would also continue to reap significant profits from other sources such as advertising and Search.<sup>256</sup> I understand further that Mr. Chase’s analysis shows that Google Play would remain profitable. Even assuming that Dr. Gentzkow is correct in asserting that Google uses Play’s profits to invest in the “long-run quality of the Android platform,” he has shown no evidence to support the claim that the DDA restrictions would affect Google’s abilities or incentives to invest in the platform.

122. Dr. Gentzkow also ignores that the DDAs reinforced the Challenged Conduct by removing yet another alternative distribution channel for would-be rivals in the Android App Distribution Market. In a more competitive but-for world, a robust rival such as the Amazon App Store would presumably not be materially impaired by the DDAs, provided it was preinstalled (or easily installed by users) on a sufficient number of devices.

123. Dr. Gentzkow claims that the DDA is not anticompetitive because “other platforms adopt similar provisions.”<sup>257</sup> Dr. Gentzkow ignores the possibility that these platforms are simply mimicking the behavior of the dominant incumbent, and the fact that such conduct can be anticompetitive when undertaken by a dominant firm, but potentially procompetitive otherwise. Dr. Gentzkow also claims that, because Google introduced the DDA in 2008, it could not have

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251. Gentzkow Report ¶476.

252. Gentzkow Report ¶473, ¶475 n.784. Dr. Gentzkow’s Fortnite example demonstrates how Google’s ominous warnings caused users to conflate legitimate alternatives with malware. *Id.*

253. Singer Merits Report ¶¶213-214.

254. Gentzkow Report ¶508.

255. Singer Report ¶304, at 139.

256. Singer Report ¶¶400-404.

257. Gentzkow Report ¶510.



reflected the exercise of Google’s monopoly power. I have responded to this claim in Part II.A above.

## **8. Dr. Gentzkow Fails to Demonstrate that the Aftermarket Tie-In Is Procompetitive**

124. Antitrust economists recognize that high-tech platform markets are susceptible to the exercise of monopoly power via anticompetitive tying.<sup>258</sup> In my Merits Report, I explained that the In-App Aftermarket Tie-In is anticompetitive according to standard antitrust principles, according to which Google has gained and maintained significant market power in the In-App Aftermarket through anticompetitive, exclusionary contractual restrictions that function as an economic tie-in of Google’s Android App Distribution Market services to its In-App Aftermarket services.<sup>259</sup> My Merits Report explained further that the In-App Aftermarket Tie-In cannot be deemed procompetitive based on the “Single Monopoly Profit” theory that has been used by some antitrust practitioners to justify tying on efficiency grounds.<sup>260</sup> Dr. Gentzkow does not claim that the Single Monopoly Profit theory applies here.

125. Ignoring standard antitrust economics, Dr. Gentzkow claims the In-App Aftermarket Tie-In is “consistent with the principles” he deems would “tend to characterize an effective service fee structure.”<sup>261</sup> Dr. Gentzkow claims that these “principles” are derived from the economic literature but fails to cite a *single article* that actually deals with tying.<sup>262</sup> Instead, Dr. Gentzkow relies on articles from the two-sided market literature and the operations literature to support (some) of his self-proclaimed “principles” for an “effective” take-rate structure.<sup>263</sup> Not one of the articles endorses tying as a procompetitive pricing structure. The pricing structures covered in these articles are different (e.g., determining the optimal fee structure for merchants and cardholders on a payment card system). There is no tying to be addressed because there is only one product on each side of the platform.

126. Dr. Gentzkow asserts that “effective service fees will tend to be proportional to an app developer’s earnings from eligible transactions rather than a fixed amount that is the same for all app developers.”<sup>264</sup> In the but-for world as I have characterized it, Google would continue to collect a take rate in proportion to developer revenue—the difference being that Google would have to compete for that business and, hence, would collect a lower proportion of developer revenue than it does in the actual world. Dr. Gentzkow’s “proportionality” requirement does not explain why Google would need to capture 100 percent of the In-App Aftermarket in a more competitive but-for world, or why Google would need to charge a monopolistic take rate of 30 percent as opposed to a more competitive take rate of approximately 15 percent. As I explained in

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258. See Susan Athey & Fiona Scott Morton, *Platform Annexation* 84 ANTITRUST LAW JOURNAL (2022) 677, 696-697 [hereafter, Athey & Scott Morton (2022)].

259. Singer Merits Report Part V.A-V.B.

260. Singer Merits Report Part V.C.

261. Gentzkow Report ¶¶144-154.

262. Gentzkow Report ¶¶137-153.

263. Dr. Gentzkow fails to cite any economic literature in support of two of his five “principles.” Gentzkow Report ¶¶144-153.

264. Gentzkow Report ¶146.

my Merits Report, Google would continue to monetize the In-App Aftermarket in a more competitive but-for world and would continue to do so profitably.<sup>265</sup>

127. Dr. Gentzkow claims incorrectly that, without the In-App Aftermarket Tie-In, “Google would have to collect its service fee from developers who use third-party billing systems by other means.”<sup>266</sup> In a more competitive but-for world, Google would still be able to compete for and collect its take rate from all developers whose business it could win based on competition on the merits, and Google could still use GPB to do so. Dr. Gentzkow’s claim that the In-App Aftermarket Tie-In “contributes to secure, efficient, and reliable collection of the service fee”<sup>267</sup> ignores that, in a more competitive but-for world, Google could still collect its take rate using the same systems it uses today for any and all business earned on the merits.

128. Dr. Gentzkow’s references to the costs of “comply[ing] with recent South Korean and European legislation requiring billing optionality”<sup>268</sup> are irrelevant; in a more competitive but-for world, competition would have dictated the structure of Google’s billing systems from the beginning, with Google collecting revenue only on transactions for which it competed successfully on the merits. Moreover, competitive billing systems would have clear economic incentives to integrate seamlessly and efficiently with their customers in the but-for world.

129. Dr. Gentzkow claims that “[b]eing unable to collect its service fee accurately and reliably would undermine Google’s incentive to invest.”<sup>269</sup> This ignores that Google would continue to profitably monetize the In-App Aftermarket in a more competitive but-for world.<sup>270</sup> Dr. Gentzkow also ignores his admission that “the broader growth of Android” would ensure Google’s profitability even if its take rate were zero.<sup>271</sup>

130. Dr. Gentzkow’s Exhibit 38 includes many misleading examples of what he calls “Platforms Requiring On-Platform Payment.” Dr. Gentzkow continues to ignore the elementary economic fact that tying requires separate products; most of the examples he cites involve fees that would likely pertain to a single product, with no analog to the In-App Aftermarket.<sup>272</sup> For example, Dr. Gentzkow does not suggest that there exists an aftermarket associated with ride hailing services such as Uber or Lyft, much less that Uber or Lyft require payments in that aftermarket to go through their platforms. The absence of an aftermarket explains the irrelevance of Dr. Gentzkow’s misguided economic analogy of parties conspiring to avoid Airbnb fees.<sup>273</sup> Dr. Gentzkow also makes no effort to demonstrate that the companies listed in Exhibit 38 are in competitive industries. For example, Steam is estimated to control approximately three-quarters of PC gaming sales.<sup>274</sup> In

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265. Singer Merits Report ¶400. Dr. Gentzkow also ignores that Google’s take rate structure in the actual world does not fully conform to his “proportionality” requirement. For example, developers that sell physical services or products (such as Uber) pay a take rate of zero.

266. Gentzkow Report ¶528.

267. Gentzkow Report ¶¶533-535.

268. Gentzkow Report ¶531.

269. Gentzkow Report ¶532.

270. Singer Merits Report ¶400.

271. Gentzkow Report ¶361(c).

272. These include Amazon (physical goods), eBay, Etsy, Walmart Marketplace, Rover, TaskRabbit, StubHub, Grubhub, Uber/Uber Eats, Lyft, VRBO/HomeAway, and AirBnB.

273. Gentzkow Report ¶539.

274. Singer Merits Report ¶314, n. 715.

Appendix 5, I review the flaws in the various platform benchmarks proposed by Dr. Gentzkow and other Google Experts.

131. Dr. Gentzkow lists various claimed advantages of GPB.<sup>275</sup> These advantages would remain in a more competitive but-for world, and Google could leverage them to compete on the merits. Of course, Google's competitors in the but-for world would also be motivated to provide desirable features on their own payment systems.

132. Dr. Gentzkow claims incorrectly that the In-App Aftermarket is limited to the billing system alone.<sup>276</sup> In fact, I clearly defined the In-App Aftermarket as "the aftermarket for services in support of consummating purchases of In-App Content on Android devices."<sup>277</sup> Paddle, a potential entrant in the In-App Aftermarket, advertises a range of services beyond payment processing.<sup>278</sup> When estimating Google's cost of providing In-App Aftermarket services, I included many cost categories beyond transaction fees.<sup>279</sup> If the In-App Aftermarket were limited only to payment processing, the competitive take rate would be significantly lower than but-for take rate of approximately 15 percent that I estimated in my Merits Report, as indicated by Google's own documents.<sup>280</sup>

133. Despite his failure to engage in market definition, Dr. Gentzkow assumes that there is no separate antitrust product market for In-App Aftermarket services. Because tying requires two separate products, his failure to recognize that In-App Aftermarket services is a distinct market is tantamount to assuming the absence of any anticompetitive tie. As my Merits Report explains, standard antitrust economics shows that the In-App Aftermarket is one-sided because the derived demand for services in support of the purchase of In-App Content in the In-App Aftermarket lacks any indirect network effects. Matchmaking services are not present in the In-App Aftermarket, because the consumer and developer are already matched.<sup>281</sup>

134. Dr. Gentzkow claims incorrectly that my "market definitions and economic frameworks implicitly (and wrongly) assume" that Google would not "continue to set a positive service fee for transactions using alternative billing systems in the but-for world."<sup>282</sup> This is not an assumption of my analysis, but rather a result of it. Google's inability to extend its monopoly power into the In-App Aftermarket in a more competitive but-for world is a direct consequence of my analysis demonstrating that there exists a separate relevant product market for In-App Aftermarket services.<sup>283</sup> Consistent with standard antitrust practice, Dr. Gentzkow could have proposed an alternative market definition, but he did not, and instead claims that his conclusions are valid "under the market definition suggested by Plaintiffs."<sup>284</sup> This is nonsensical: If I am

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275. Gentzkow Report ¶¶540-541.

276. Gentzkow Report ¶544.

277. Singer Merits Report ¶2.

278. Paddle, *In-App Purchase*, <https://www.paddle.com/platform/in-app-purchase>.

279. Singer Merits Report ¶324.

280. Singer Merits Report ¶322.

281. Singer Merits Report ¶144.

282. Gentzkow Report ¶550.

283. Singer Merits Report Part III.A. It is further confirmed by my analysis demonstrating that the so-called "Single Monopoly Profit" theory does not apply here. Singer Merits Report Part V.C.

284. Gentzkow Report ¶177.

correct in concluding that there is a separate In-App Aftermarket, then, under competition, Google would only be able to earn revenue in the In-App Aftermarket to the extent that it actually serves customers in the In-App Aftermarket.

135. Dr. Gentzkow claims “where[ver] Google has implemented [REDACTED] billing optionality for developers who were previously paying non-zero service fees, Google has also charged [REDACTED] a non-zero service fee for transactions using alternative billing systems.”<sup>285</sup> This simply reflects Google’s incentive and ability to replicate the In-App Aftermarket Tie-In in the actual world, given that it retains substantial monopoly power in the Android App Distribution Market. In a competitive but-for world, Google would not be able to charge a supracompetitive take rate for all sales of In-App Content in perpetuity. It is also possible that the alternative billing systems in Korea are providing only a subset of the services encompassed by the In-App Aftermarket. Similarly, the ONE store’s decision to charge a (relatively modest) five percent take rate on transactions processed through alternative billing systems can be viewed as an economically rational response to Google’s ability to charge a (substantially higher) take rate as high as 26% on transactions processed through alternative billing systems.<sup>286</sup>

136. Dr. Gentzkow claims that “[t]he fact that app developers including Epic have an interest in bypassing Google Play’s billing system for certain in-app transactions does not provide evidence of a separate market; it simply reflects these app developers’ incentive to free ride.”<sup>287</sup> As I explained in my Merits Report, [REDACTED]

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137. In addition, various well-known Apps chose not to adopt Google Play Billing, including Hulu, Kindle, Netflix, and Tinder—[REDACTED]

.<sup>290</sup>

138. Dr. Gentzkow claims that “developers are not actually coerced or required to use Google Play’s billing system,” because “developers are not required to use Google Play’s billing system if they choose to monetize via means other than initial download fees or in-app purchases.”<sup>291</sup> This is rather like an automobile monopolist asserting that dealerships are not “coerced” into purchasing cars at monopolistic prices because they may choose to sell a motorcycle instead. The question is not whether other monetization strategies exist, but rather whether a (not-so) hypothetical monopolist over the multibillion-dollar In-App Aftermarket could profitably raise

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285. Gentzkow Report ¶554.

286. Wilson White, *Enabling alternative billing systems for users in South Korea*, Google Developers (Nov. 4, 2021), <https://developers-kor.googleblog.com/2021/11/enabling-alternative-billing-in-korea-en.html>.

287. Gentzkow Report ¶46.

288. Singer Merits Report ¶145.

289. Singer Merits Report ¶145.

290. Singer Merits Report ¶¶146-149.

291. Gentzkow Report ¶570.

prices significantly above competitive levels. My analysis of the relevant antitrust product market confirms that it could.

## 9. Dr. Gentzkow Fails to Demonstrate Other Challenged Conduct Is Procompetitive

a. [REDACTED]

139. In my Merits Report, I explained that Google appears to have successfully discouraged [REDACTED] from effectively competing with the Play Store, and that Google's efforts to do so included [REDACTED].<sup>292</sup> Dr. Gentzkow claims that [REDACTED] was abandoned by Google and it never governed actual market transactions,<sup>293</sup> and that "plaintiffs' experts provide no evidence that it impacted actual market competition[.]"<sup>294</sup> In fact, although record evidence indicated [REDACTED], it also establishes that [REDACTED].

[REDACTED]<sup>295</sup> worked in concert with other aspects of the Challenged Conduct, including Project Hug, [REDACTED].

[REDACTED]<sup>296</sup> itself had no procompetitive justification. [REDACTED]

[REDACTED] Indeed, the record reflects that [REDACTED]. An internal presentation at Google characterized [REDACTED] as [REDACTED].

[REDACTED]<sup>297</sup>

### b. App Campaigns

141. In my Merits Report, I explained that developers must list their Apps in the Play Store to access Google's App Campaigns program, which allows developers to place ads for Apps and In-App Content on Google's most valuable properties, including Google Search, YouTube, Discover on Google Search, and the Google Display Network. I explained that this conduct further entrenched Google's monopoly power in the Android App Distribution Market because developers

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292. Singer Merits Report ¶¶201-206.

293. Gentzkow Report ¶576.

294. Gentzkow Report ¶576.

295. Singer Merits Report ¶¶222-223.

296. Singer Merits Report ¶217.

297. Rosenberg Dep. 99:1-9 [REDACTED]

298. GOOG-PLAY-010449493 at -497.



that did not list their Apps in the Play Store would risk losing advertising access to some of the Internet's most effective advertising space.<sup>299</sup>

142. Dr. Gentzkow claims that Google's App Campaigns are procompetitive because Google offers App Campaigns to developers in the Apple App Store.<sup>300</sup> Dr. Gentzkow is wrong. First, the Apple App Store is not part of the Android App Distribution Market. Second, that Google offers App Campaigns to developers in the Apple App Store (*outside* the Android ecosystem) undermines Dr. Gentzkow's claim that extending App Campaigns to other App stores *within* the Android ecosystem would be inefficient.<sup>301</sup>

c. [REDACTED]

143. In my Merits Report, I explained that Google may have secured a long-lasting commitment from [REDACTED] not to enter the Android App Distribution Market [REDACTED].<sup>302</sup> Although I did not opine on the existence of such an agreement, if the fact finder determines that [REDACTED] did reach such an agreement,<sup>303</sup> it likely would have generated anticompetitive effects. Dr. Gentzkow does not challenge this conclusion.

144. My Merits Report also reviewed evidence that Google offered [REDACTED].<sup>304</sup> Dr. Gentzkow does not dispute that [REDACTED].<sup>305</sup> Nor does Dr. Gentzkow dispute that an agreement between the two companies [REDACTED] would have had anticompetitive effects.

145. Instead, Dr. Gentzkow points to purported procompetitive benefits from [REDACTED]. Dr. Gentzkow asserts that, [REDACTED].

299. Singer Merits Report ¶¶213-214.

300. Gentzkow Report ¶580.

301. Gentzkow Report ¶581.

302. Singer Merits Report ¶¶231-237.

303. Dr. Gentzkow cites a document indicating that [REDACTED].

[REDACTED] GOOG-PLAY-002425286 at -287. I understand that at least one Google witness has given testimony [REDACTED]. Kochikar Dep. 425:18-22 [REDACTED].

[REDACTED]. As explained in my Merits Report, Google documents and employee testimony indicate [REDACTED]. See Singer Report ¶236; GOOG-PLAY-000083999; see also GOOG-PLAY-006367390 ([REDACTED]); see also Rasanen Dep. 204:9-16. To reiterate, I am not opining on the existence of the alleged agreement.

304. Singer Merits Report ¶¶231-237; GOOG-PLAY-011541267 [REDACTED].

305. Gentzkow Report ¶587. One Google employee assessed [REDACTED]. GOOG-PLAY-007379918 ([REDACTED]).



308

<sup>313</sup> Dr. Gentzkow also

fails to demonstrate that users benefitted from greater privacy or security [REDACTED]

<sup>314</sup>

148. If the alleged agreement was in fact effective [REDACTED]

[REDACTED] . As Dr. Gentzkow concedes,

<sup>315</sup>

149. As illustrated below, Google's documents recognize that, [REDACTED]

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314. Dr. Gentzkow cites no evidence regarding malware or privacy risks posed [REDACTED]

[REDACTED] . Gentzkow Report ¶591. Record evidence indicates that Google [REDACTED]

[REDACTED] GOOG-PLAY-009261089 at -091-092.

315. Gentzkow Report ¶591, citing GOOG-PLAY-004728095.R -096.R. This document shows that [REDACTED]

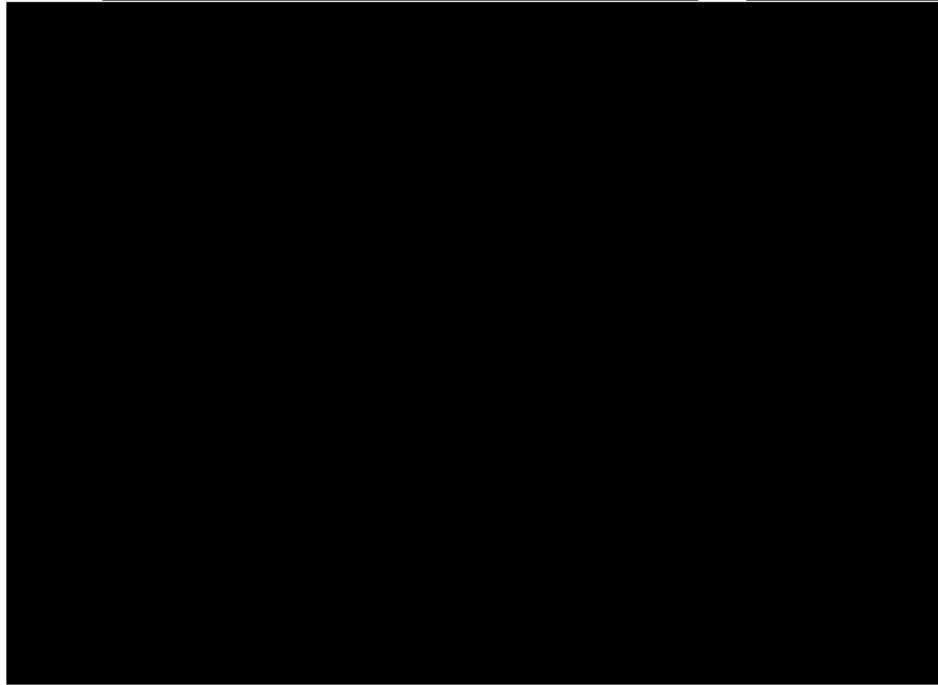
[REDACTED] . *Id.* at -124.R.

316. GOOG-PLAY-004728095.R, at -129.R.

317. GOOG-PLAY-000103456.R at -463.R.

318. [REDACTED] 000015465, at 5-6.

FIGURE 6: [REDACTED] [REDACTED] [REDACTED]”



Source: GOOG-PLAY-004697790.R at -817.R

150. In summary, to the extent Google managed to [REDACTED] this likely had significant anticompetitive effects on consumers, particularly given the competitive potential of [REDACTED]

319

### C. Dr. Gentzkow Ignores Standard Antitrust Principles

#### 1. Dr. Gentzkow’s Conclusion That “Competition Has Not Been Foreclosed” Does Not Follow From Standard Antitrust Principles

151. Although Dr. Gentzkow purports to demonstrate that “competition has not been foreclosed,”<sup>320</sup> his analysis of foreclosure is not grounded in standard antitrust economics. According to Dr. Gentzkow, the Challenged Conduct does not constitute anticompetitive foreclosure because it has not entirely eliminated “users’ and app developers’ access to alternative means of interacting [outside of the Play Store].”<sup>321</sup> Dr. Gentzkow’s standards for establishing “access” are not grounded in standard economics and are so lenient that they would preclude

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319. Dr. Gentzkow implicitly concedes this. Gentzkow Report ¶596 [REDACTED]

[REDACTED]; Karam Dep. 180:2-8 ([REDACTED]).

320. Gentzkow Report Part VI.

321. Gentzkow Report ¶178.

antitrust intervention in virtually any real-world high-tech platform market. Antitrust economists recognize that anticompetitive foreclosure “totally *or partially*” denies competitors from access to “critical inputs or customers.”<sup>322</sup> Rivals need not be completely excluded from the market; anticompetitive harm occurs when rivals remain in the market but their ability to impose competitive discipline is compromised.<sup>323</sup> Conduct that makes rivals less efficient makes them less competitive. But if Dr. Gentzkow is to be believed, evidence of “access” through virtually any alternative, no matter how inferior or inefficient, is proof that foreclosure could not have occurred.

152. For example, Dr. Gentzkow portrays the fact that the Samsung Galaxy Store is (for some users) “literally a click away”<sup>324</sup> as evidence of robust competition. But as I explained in my Merits Report, [REDACTED]

[REDACTED]<sup>325</sup> As Dr. Gentzkow correctly observes, Samsung’s headline take rate is 30 percent—no different than the Play Store’s.<sup>326</sup> This reflects Samsung’s inability (or unwillingness) to compete effectively—as does Samsung’s failure to announce even modest take rate reductions in response those that Google has implemented for small developers and subscription developers. As a consequence, despite being “a click away” for users of Samsung devices, the Samsung Galaxy Store accounts for [REDACTED]<sup>327</sup> and the number<sup>328</sup> and quality<sup>329</sup> of Apps on the Samsung Galaxy Store is far below that of the Play Store. In addition, [REDACTED]

[REDACTED]<sup>330</sup> Dr. Gentzkow himself presents data showing that, even among users of Samsung devices, U.S. consumer expenditure in the Galaxy Store is about [REDACTED].<sup>331</sup> In Exhibit 14 of his report, Dr. Gentzkow presents the “Share of GMS Devices with a Preinstalled App Store,” [REDACTED]

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322. Steven Salop, *The Raising Rivals’ Cost Foreclosure Paradigm, Conditional Pricing Practices, and the Flawed Incremental Price-Cost Test* 81(2) ANTITRUST LAW JOURNAL 371, 376 (2017) (emphasis added).

323. *Id.* at 377.

324. Gentzkow Report ¶31.

325. Singer Merits Report ¶¶201-207.

326. Gentzkow Exhibit 10.

327. Singer Merits Report ¶¶125-126; Figures 8-9.

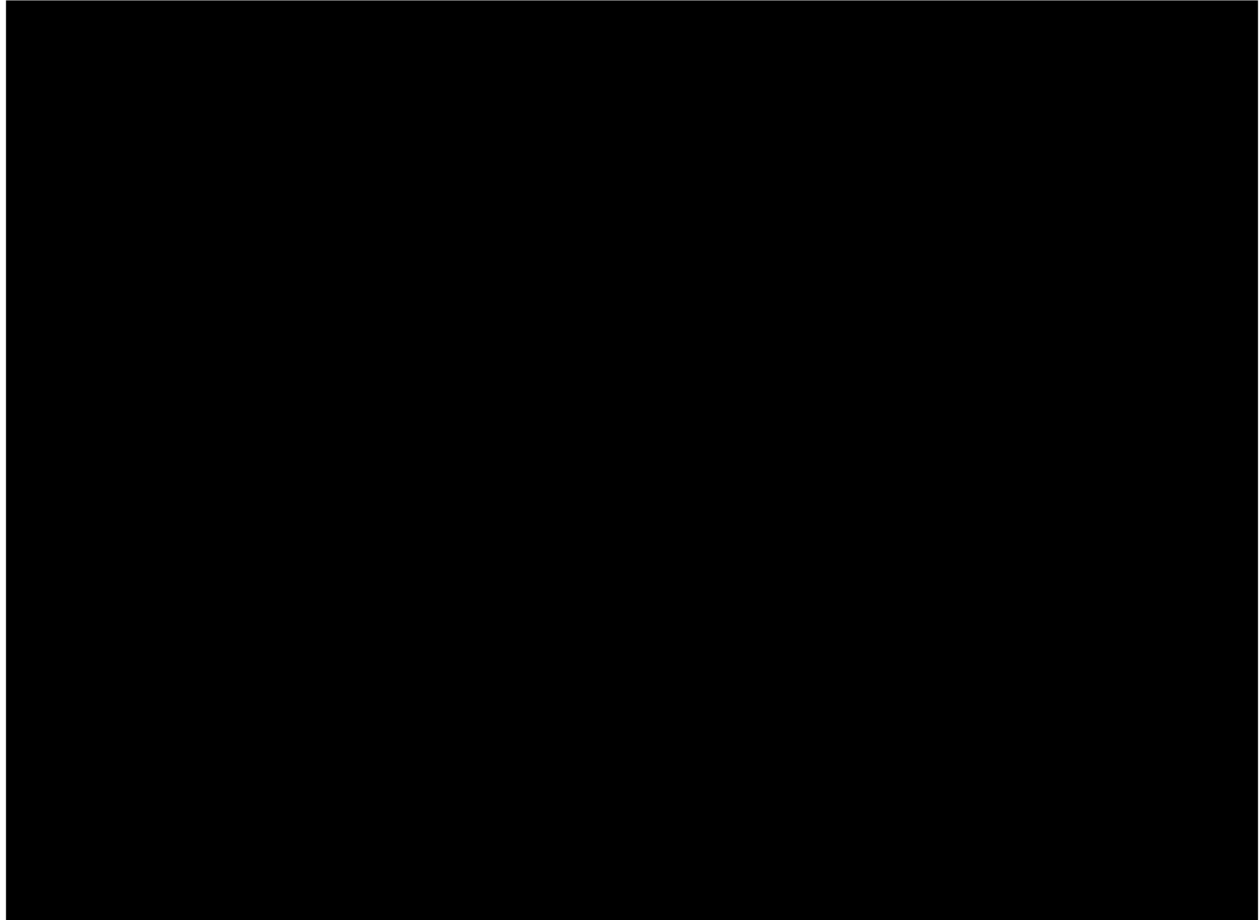
328. Gentzkow Report Exhibit 27 (showing 191,128 Apps available in Samsung Galaxy Store, compared with over 3.2 million in the Play Store).

329. Singer Merits Report ¶131; Table 3 (as of mid-2022, only eight of the top 20 most-downloaded Play Store Apps were also available in the Galaxy Store).

330. Singer Merits Report ¶170; Figure 12.

331. Gentzkow Report Exhibit 26 [REDACTED].

FIGURE 7: SHARE OF GMS DEVICES WITH PREINSTALLED OEM APP STORE



Sources: “OEM Footprint Data (2015-2021)”; GOOG-PLAY-010801683; Gentzkow workpapers.

153. Dr. Gentzkow interprets [REDACTED] <sup>32</sup>—as evidence that competition was not foreclosed.<sup>333</sup> Google has deployed multiple measures in the OEM channel,<sup>334</sup> in addition to technical barriers,<sup>335</sup> to ensure that Amazon would not become an effective competitor.<sup>336</sup> [REDACTED]

<sup>338</sup>

332. Singer Merits Report Table 4.

333. Gentzkow Report ¶181.

334. Singer Merits Report Part IV.A.2.b.

335. Singer Merits Report Part IV.A.4.

336. Dr. Gentzkow also does not dispute any of my calculations showing that alternative App stores account for at most a trivial fraction of the Android App Distribution Market. Singer Merits Report Part II.C.2.a.

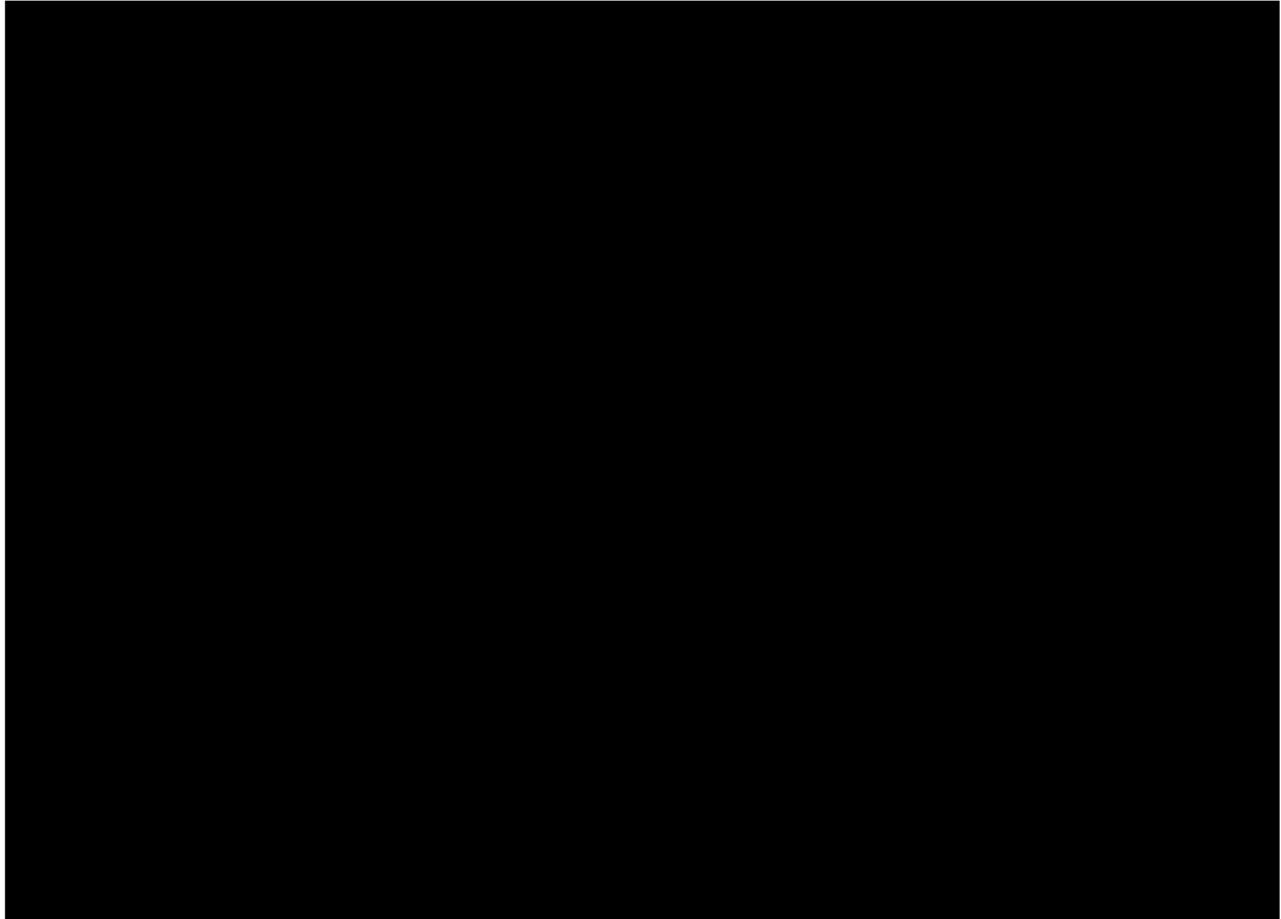
337. Singer Merits Report ¶313; ¶417.

338. AMZ-GP 00002471 (Morrill Exhibit 1363) ([REDACTED])



154. The same data that Dr. Gentzkow cites to argue for the prevalence of competition in fact demonstrates [REDACTED]:

FIGURE 8: SHARE OF GMS DEVICES WITH A PREINSTALLED AMAZON APP STORE



Source: GOOG-PLAY-010801683. The orange line contains [REDACTED]

[REDACTED]

155. According to Amazon, [REDACTED]

[REDACTED]

156. As shown below, Google's own analysis from 2018 [REDACTED]

[REDACTED]

---

339. AMZ-GP 00002484 at -2488 [REDACTED]

[REDACTED] Google's [REDACTED] at GOOG-PLAY-010801683 shows [REDACTED].

340. AMZ-GP\_00005705. [REDACTED]

341

FIGURE 9: AMAZON APPSTORE'S SMALL AND DECLINING PENETRATION

Source: GOOG-PLAY-006381392.R at -406.R

157. Record evidence indicates

343

158. The record includes

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341. GOOG-PLAY-006381392.R at -406.R.

342. Morrill Dep. 123:20-125:24 ([REDACTED]); 184:20-186:11.

343. Rosenberg Dep. 62:14-64:3.

344. GOOG-PLAY-009911757 [REDACTED]

159. Record evidence also indicates that

160. Although Google reduced its revenue shares in later years, record evidence indicates that [REDACTED]

549

161. Dr. Gentzkow does not dispute my finding that the Play Store accounts for the vast majority of App installs and updates on Google Android devices,<sup>350</sup> even when one charitably includes [REDACTED]

[REDACTED]. Dr. Gentzkow is incorrect to claim that “access” to P2P Apps provides proof that foreclosure has not occurred in the Android App Distribution Market.

162. Record evidence indicates that

<sup>352</sup> Google has also found that

<sup>35</sup> Consistent with P2P's complementary role, in 2018 Google announced a partnership with ShareIt and other P2P Apps in which "Play [would] be able to determine shared app

351. See GOOG-PLAY-000399013 at -13-14 (

353. *Id.* at 13-14.

authenticity while a device is offline, add those shared apps to a user's Play Library, and manage app updates when the device comes back online.”<sup>354</sup> Google would face clear economic incentives to enter into such agreements if it were able to collect a take rate on Apps distributed via P2P, and record evidence indicates that it does.<sup>355</sup>

163. In Exhibit 16 of his report, Dr. Gentzkow presents the “Number of App Installations from Alternative Sources,” but neglects to compare it with the number of App installations via the Play Store. As shown below, [REDACTED].

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354. See James Bender, *Google Play offline peer to peer installs beta*, Android Developers Blog (Oct. 19, 2018), <https://android-developers.googleblog.com/2018/10/offline-p2p-installs-beta.html>; see also GOOG-PLAY-000791152 at -153 [REDACTED].

[REDACTED] GOOG-PLAY-001026503.

355. For example, record evidence indicates ShareIt was distributing the same versions of the Apps distributed through the Play Store, and the Play Store was adopting those apps, including “add[ing] those shared apps to a user's Play Library, and manag[ing] app updates when the device comes back online.” James Bender, *Google Play offline peer to peer installs beta*, Android Developers Blog (Oct. 19, 2018), <https://android-developers.googleblog.com/2018/10/offline-p2p-installs-beta.html>. Once Play has adopted an App in the Play Library, it receives its standard take rate. See GOOG-PLAY-004694345 at -5217 [REDACTED]”).

FIGURE 10: APP INSTALLS BY SOURCE ON GOOGLE ANDROID DEVICES



Sources: GOOG-PLAY-000808464; Gentzkow workpapers

164. In my Merits Report, I explained that Google's most recent series of OEM agreements provide OEMs with additional economic incentives not to compete in App distribution in exchange for payments from Google.<sup>356</sup> These new RSAs

further foreclose competition in the Android App Distribution Market. These contracts

<sup>357</sup> In exchange,

<sup>358</sup> Google is therefore

356. Singer Merits Report ¶¶208-211.

357. See, e.g., GOOG-PLAY-000620210 at -221

). *Id.* at -212

See also GOOG-PLAY-001745614 at -625 (

); GOOG-PLAY-000416651 at -662 (

); GOOG-PLAY-001745614 at -625 (

358. See, e.g., GOOG-PLAY-000443763.R at -3775.R (

) *Id.* at -3769.R (

004494430.C at -4443.C (



[REDACTED]

165. Dr. Gentzkow attempts to minimize the importance of these contracts, [REDACTED]

[REDACTED]

<sup>359</sup> In presenting this statistic, Dr. Gentzkow ignores at least two economically significant facts. *First*, [REDACTED]

[REDACTED]

[REDACTED] . Record evidence indicates [REDACTED]

[REDACTED]

[REDACTED] <sup>360</sup> .

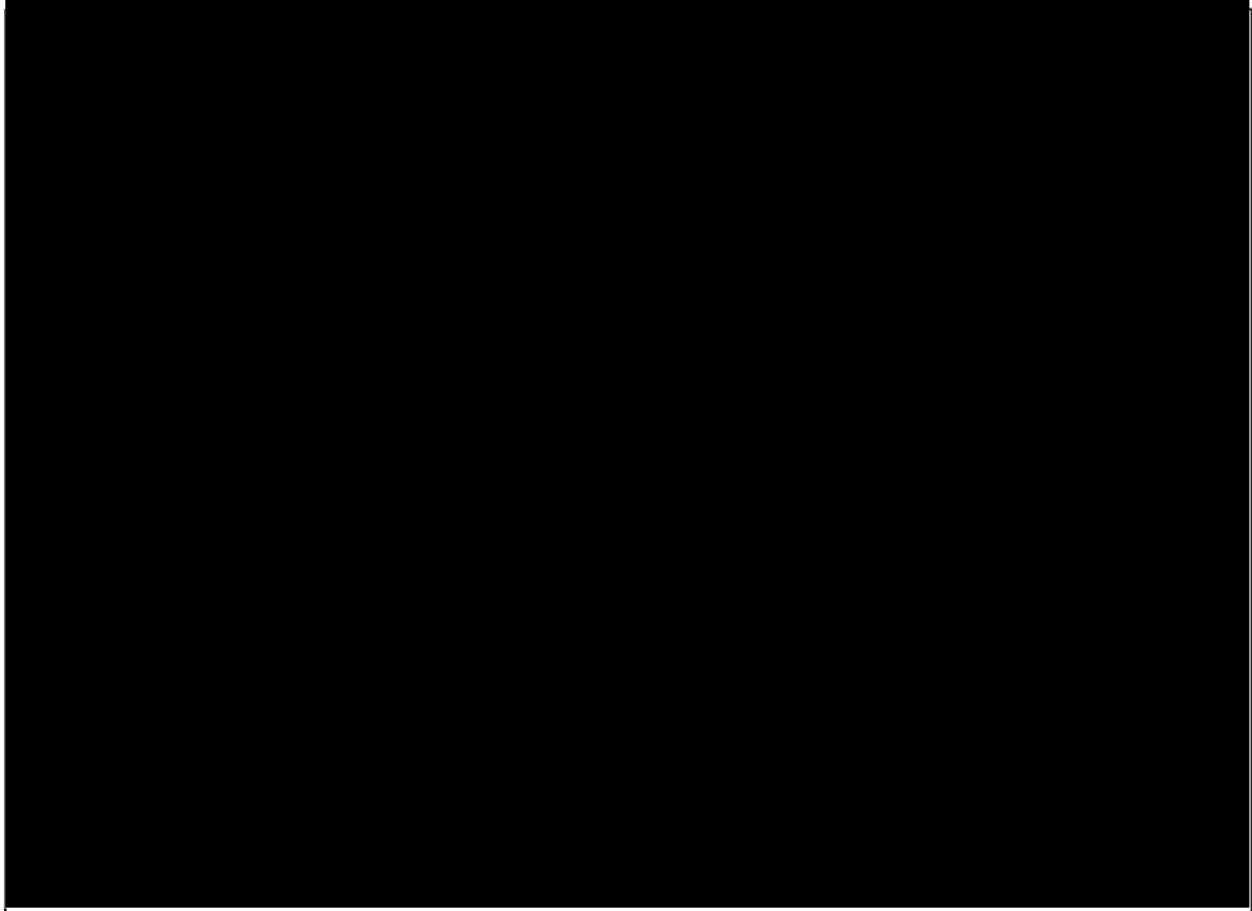
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‘Nexus-like’ experience,” including “No competing platforms (e.g., alternate app stores.”)). Nexus is the brand name previously used for smartphones made by Google. *See, e.g.*, Jessica Dolcourt, *Google Nexus 6P review: Best-ever Nexus sets new standard for big-screen Android value*, CNET (Jul. 19, 2016), <https://www.cnet.com/reviews/google-nexus-6p-review/>.

359. Gentzkow Report ¶396.

360. GOOG-PLAY4-004260189 at -190.

FIGURE 11: SHARE OF NEW DEVICE ACTIVATIONS SUBJECT TO RSA 3 PREMIER TIER  
WORLDWIDE (EXCLUDING CHINA)



Source: GOOG-PLAY-011657415.xlsx, GOOG-PLAY-011657416.xlsx, GOOG-PLAY-011657417.xlsx, GOOG-PLAY-011657418.xlsx, GOOG-PLAY-011657419.xlsx, GOOG-PLAY-011657420.xlsx, GOOG-PLAY-011657421.xlsx, GOOG-PLAY-011657422.xlsx, GOOG-PLAY-011657423.xlsx, and GOOG-PLAY-011657424.xlsx.

[REDACTED]

166. Second, [REDACTED]

[REDACTED] The data underlying Figure 1 above show that [REDACTED]

[REDACTED] <sup>362</sup> As Google's documents recognize, [REDACTED]

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361. See GOOG-PLAY-011657415-GOOG-PLAY-011657425 [REDACTED].

362. Singer Merits Report ¶11.

63

167. Record evidence shows that

. According to the same document,

<sup>364</sup> The Executive Summary explains

366

168. The [REDACTED]s therefore complement other aspects of the Challenged Conduct that have successfully suppressed competition in the Android App Distribution Market. As explained in my Merits Report, Google deployed the MADAs to ensure that the Play Store received prominent placement on every single GMS device,<sup>367</sup> and deployed Project Hug to secure content from some of the largest developers, preventing them from giving competing stores the exclusive content necessary to help drive usage, and by imposing content parity requirements on certain developers, all of which impaired entry and expansion by competing App stores.<sup>368</sup> [REDACTED]  
[REDACTED]<sup>369</sup> Record evidence indicates that [REDACTED]

371

## 2. Dr. Gentzkow Ignores the Coordinated Nature and Effects of the Challenged Conduct

169. In my Merits Report, I demonstrated how the Challenged Conduct allowed Google, through coordinated and mutually reinforcing conduct, to amass monopoly power and to engage in anticompetitive conduct harmful to Consumer Plaintiffs. Antitrust economists recognize that

363. GOOG-PLAY4-004260189, at -222. *Id.* at -193 [REDACTED]

364. GOOG-PLAY4-004260189 at -199.

365. GOOG-PLAY4-004260189 at -190.

366. GOOG-PLAY4-004260189 at -190. *Id.* at -195 ([REDACTED]) *Id.* at -198 [REDACTED]

367. Signer Merits Report ¶¶194-197.

368. Singer Merits Report ¶¶215-230.

369. GOOG-PLAY4-004260189, at -206 ([REDACTED])

370. GOOG-PLAY4-004260189 at -207.

371. GOOG-PLAY4-004260189 at -207 [REDACTED]

anticompetitive conduct among high-tech platforms typically involves mutually reinforcing strategies, reinforced by network effects and incumbency advantage.<sup>372</sup> Record evidence indicates that Google [REDACTED].<sup>373</sup>

170. Despite this well-understood phenomenon, Dr. Gentzkow evaluates the Challenged Conduct piecemeal. For example, Dr. Gentzkow evaluates Google's early RSAs<sup>374</sup> separately from the later RSAs.<sup>375</sup> But as I explained in my Merits Report, both the early and the late RSAs were part of a long-term strategy that allowed Google to achieve dominance and engage in anticompetitive exclusionary conduct in the Android App Distribution Market.<sup>376</sup> More broadly, Google's substantial foreclosure of the Android App Distribution Market was the combined result of different elements of the Challenged Conduct, including the RSAs, Google's exclusionary restraints on OEMs, Project Hug, Google's technical restrictions, and other conduct detailed in my Merits Report.<sup>377</sup> The collective effect of this conduct was to deprive would-be rivals of the ability to compete effectively with the Play Store.

### 3. Dr. Gentzkow's "Fragmentation" Defense Is Without Merit

171. Dr. Gentzkow claims that the Challenged Conduct was necessary to prevent what he terms "device fragmentation"<sup>378</sup> and "app store fragmentation."<sup>379</sup> According to Dr. Gentzkow, device fragmentation occurs when "the devices in the ecosystem are incompatible or only partly compatible with each other,"<sup>380</sup> and app store fragmentation occurs "when no app store(s) contain a comprehensive set of apps and many app stores are accessible only to certain groups of users."<sup>381</sup>

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372. See, e.g., Singer Merits Report ¶¶29; ¶82; ¶88; ¶¶135-136; ¶¶187-188; see also Athey & Scott Morton (2022) at 679 ("Platform annexation disrupts multi-homing by steering users to its platform and away from platforms of rivals. When a large platform deprives a smaller rival of participants on either side of the market, it reduces the competitiveness of the smaller platform (or deters entry by new, smaller platforms) and thus lessens the competitive pressure on itself. This advantage is often self-reinforcing because it generates further concentration of activity in the larger platform and marginalization or exit of the small platform. This kind of feedback loop often characterizes multi-sided platforms more than "old economy" businesses. And the feedback loop increases the efficacy of the platform's strategy, enabling it to increase its profits and reduce welfare for platform constituents in the short and long run.").

373. See, e.g., GOOG-PLAY-000565846; GOOG-PLAY-001265881; GOOG-PLAY-004708826; GOOG-PLAY-000005029; GOOG-PLAY-000879069; GOOG-PLAY-001265881; GOOG-PLAY-000463493.

374. Gentzkow Report Part IX.

375. Gentzkow Report Part X.

376. Singer Merits Report Part IV.A.

377. Singer Merits Report Part IV.B.

378. Gentzkow Report ¶104.

379. Gentzkow Report ¶105.

380. Gentzkow Report ¶104 ("Fragmentation on a smart device platform such as Android takes many forms, of which two are particularly relevant. The first is what I will refer to as device fragmentation. This does not refer to having a large number of devices in the ecosystem; fragmentation does not increase just because more device makers enter, existing device makers become more successful, and/or the market becomes more competitive. Rather, device fragmentation refers to a situation in which the devices in the ecosystem are incompatible or only partly compatible with each other—i.e., they do not share a common baseline set of core capabilities and features that app developers rely on.").

381. Gentzkow Report ¶105 ("The second form is app store fragmentation. This does not refer to having a large number of app stores in the ecosystem; fragmentation does not increase just because more app stores enter, existing app stores become more successful, and/or app distribution becomes more competitive. Rather, app store fragmentation occurs when no app store(s) contain a comprehensive set of apps and many app stores are accessible only to certain groups of users.").

According to Dr. Gentzkow, fragmentation “can effectively split a single platform into separate sub-platforms.”<sup>382</sup>

172. Dr. Gentzkow is incorrect to assume that a more competitive but-for world would be characterized by harmful fragmentation. Dr. Gentzkow provides no evidence that what he calls “app store fragmentation” is harmful; as explained below, Dr. Gentzkow incorrectly conflates fragmentation in App distribution with mobile OS fragmentation. As Dr. Gentzkow concedes, “fragmentation does not increase just because more app stores enter, existing app stores become more successful, and/or app distribution becomes more competitive.”<sup>383</sup> I agree with Dr. Gentzkow that entry and/or expansion by App distribution rivals such as the Amazon Appstore—the key driver of competition in the Android App Distribution Market in a more competitive but-for world—does not imply increased fragmentation.

173. Increased competition from the Amazon Appstore (and/or other App distribution rivals) does not imply that “no app store(s) [would] contain a comprehensive set of apps and many app stores [would be] accessible only to certain groups of users.”<sup>384</sup> Due to indirect network effects, rival App stores would need to attract as many developers and users as possible in order to compete successfully.<sup>385</sup> For example, a rival App store that could “only be accessed by [a single] OEM’s or MNO’s users,”<sup>386</sup> as Dr. Gentzkow suggests, would be at a distinct competitive disadvantage. It would be less attractive to developers because the size of its user base would be constrained; this would discourage developers from distributing their Apps through the App store, making it less attractive to users. I understand that Professor Schmidt has found that the technical barriers to developing Apps capable of functioning in multiple Android App stores are modest. And a competing App store would face clear economic incentives to minimize any incremental costs associated with making their Apps available on that store.

174. Dr. Gentzkow provides no evidence or any convincing economic rationale as to why limited App exclusives by emerging competitors to Google Play would harm the Android ecosystem. Elsewhere in his report, Dr. Gentzkow defends deals for exclusive distribution of products as indicative of “competition on the merits.”<sup>387</sup> Google documents [REDACTED]

388

175. Dr. Gentzkow incorrectly conflates fragmentation in App distribution with mobile OS fragmentation. Dr. Gentzkow offers examples of older industries (fax systems, quadrasonic sound, 56kbps modems, and the UNIX operating system) in which industry participants failed to

382. Gentzkow Report ¶103.

383. Gentzkow Report ¶105.

384. Gentzkow Report ¶105.

385. Singer Merits Report ¶24; ¶82. Dr. Gentzkow agrees that there are substantial indirect network effects. Gentzkow Report ¶74.

386. Gentzkow Report ¶105.

387. Gentzkow Report ¶377.

388. Singer Merits Report Part IV.A.3.b; see GOOG-PLAY-007814830.R at -835.R-836.R [REDACTED]

[REDACTED]; *id.* at -858.R [REDACTED]

[REDACTED]).



adopt compatible technology standards, and incorrectly presents it as evidence that the Android App Distribution Market would become fragmented in the but-for world.<sup>389</sup> Dr. Gentzkow misunderstands the Challenged Conduct, which impaired competition within Google Android, as opposed to competition across different mobile operating systems. A competing App store does not need to saddle users with a new mobile OS; as Dr. Gentzkow concedes, it can be “just a click away[.]”<sup>390</sup> Users may have dozens of Apps on their devices (all “just a click away”), including competing Apps such as Uber and Lyft, but this does not imply that the Android ecosystem is fragmented. As explained above, I understand the technical barriers deploying Apps that would be cross-compatible with different Google Android App stores are modest. In a more competitive but-for world, competing App stores would face clear economic incentives to attract developers by minimizing any incremental costs to developers associated with adding more Apps to their stores.

176. Dr. Gentzkow continues to incorrectly conflate fragmentation in App distribution with mobile OS fragmentation when he emphasizes the failure of Symbian, a discontinued mobile OS.<sup>391</sup> The evidence reviewed by Dr. Gentzkow indicates that Symbian made ill-advised business decisions in the design of its mobile OS, with “mutually incompatible user interfaces,”<sup>392</sup> frustrating the development of indirect network effects within the Symbian OS. Economists have observed that “[t]he way [Symbian] was constructed meant that its software providers couldn’t introduce the sorts of innovations that were driving the personal computer and web economies.”<sup>393</sup> None of the evidence reviewed by Dr. Gentzkow establishes that so-called “app store fragmentation” contributed to Symbian’s failure. The but-for world would entail increased competition within the Android App Distribution Market on Google Android devices, not mutually incompatible interfaces.

#### **4. Dr. Gentzkow Incorrectly Assumes That All Improvements in Output and Quality Are Attributable to the Challenged Conduct**

177. Increasing output and improvements in quality over time are the norm for computerized technology markets.<sup>394</sup> But when Dr. Gentzkow observes similar trends in this case, he incorrectly infers that the Challenged Conduct must have been procompetitive.<sup>395</sup> Dr. Gentzkow provides no evidence that the Challenged Conduct caused any of these trends.

178. In Exhibit 2 of his report, Dr. Gentzkow observes that the quantity of Android smartphones sold has increased over time, along with the number of app downloads, the number

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389. Gentzkow Report ¶107.

390. Gentzkow Report ¶31.

391. Gentzkow Report ¶¶110-113.

392. Gentzkow Report ¶111.

393. David S. Evans and Richard Schmalensee, *Matchmakers: The New Economics of Multisided Platforms*, (Harvard Business Review Press 2016) at 111.

394. See, e.g., Ernst Berndt & Neal Rappaport, *Price and Quality of Desktop and Mobile Personal Computers: A Quarter-Century Historical Overview* 91(2) *AMERICAN ECONOMIC REVIEW* 268 (2001).

395. Gentzkow Report ¶155 (“The broad trends documented in this section suggest that Google has succeeded in addressing the core collective action problems on Android and creating a thriving ecosystem that generates tremendous value for users, app developers, and other platform participants. Output and quality have increased dramatically while prices have fallen or remained stable.”).

of new apps available, and the revenues of app developers. Dr. Gentzkow makes no attempt to demonstrate that any of these trends were caused by the Challenged Conduct. In my Merits Report, I showed that output in the Android App Distribution Market and the In-App Aftermarket would have increased by approximately [REDACTED] percent in the but-for world.<sup>396</sup>

179. In Exhibit 3 of his report, Dr. Gentzkow displays data indicating that “average prices for Android smartphones are relatively low and have fallen over time,”<sup>397</sup> and notes that “[t]his contrasts with prices for iOS smartphones which are higher and have been increasing.”<sup>398</sup> This is consistent with my Merits Report, in which I observed that “distinct pricing and features” is one of the factors that helps to insulate iOS and Google Android from head-to-head competition.<sup>399</sup> Dr. Gentzkow provides no convincing evidence that observed trends in the average price of Android smartphones are caused by the Challenged Conduct. Nor does he address the fact that prices of other consumer technologies have fallen by as much or more than Android smartphones.<sup>400</sup> By Dr. Gentzkow’s logic, this evidence would suggest that the Challenged Conduct may have caused the price of Android smartphones to decline by less than they would have otherwise.

180. In Exhibit 4 of his report, Dr. Gentzkow displays the (simple) average take rate paid by U.S. developers and emphasizes a decline in the (simple) average take rate at the end of the Class Period. This metric is misleading because it does not reflect the portion of developer revenue that Google retains in the aggregate. A more meaningful measure of Google’s pricing is the weighted average take rate for all U.S. transactions, shown in Figure 12. As seen below, the weighted average take rate for non-subscription developers has remained fixed at almost exactly [REDACTED] percent for the majority of the Class Period; it has fallen irregularly since mid-2021, landing at [REDACTED] percent in May 2022. When subscription developers are included, the weighted average take rate is fixed between [REDACTED] and [REDACTED] percent for the majority of the Class Period; it has fallen irregularly since mid-2021, landing at [REDACTED] percent in May 2022. Google’s weighted average take rate has consistently remained far above the competitive level of approximately 15 percent.

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396. Singer Merits Report ¶398, Figure 20. Dr. Gentzkow does not specifically critique my but-for output analysis, except to the extent that he claims (incorrectly) that my economic models assume their conclusions. Gentzkow Report ¶599.

397. Gentzkow Report ¶161.

398. Gentzkow Report ¶161.

399. Singer Merits Report Part I.A.1.b.

400. For example, according to the Bureau of Labor Statistics, the price of televisions declined by approximately 75 percent from 2008 through 2015. *See, e.g.,* <https://www.bls.gov/opub/ted/2015/long-term-price-trends-for-computers-tvs-and-related-items.htm>

FIGURE 12: GOOGLE PLAY WEIGHTED AVERAGE TAKE RATE  
(US TRANSACTIONS, AUGUST 2016-MAY 2022)



Source: Google Transaction Data.

181. In Exhibit 10 of his report, Dr. Gentzkow presents what he terms “Standard Service Fees for Major Mobile App Stores.” In Exhibit 11, he presents “Service Fees for Other Selected Platforms.” In Appendix 5, I review the various benchmarks offered by each of the Google Experts and I explain why they are unpersuasive.

**D. Dr. Gentzkow Fails to Demonstrate That Consumer Plaintiffs Have Not Suffered Antitrust Injury Resulting From Google’s Anticompetitive Conduct, or that Consumer Plaintiffs “Would Likely Be Worse Off” Absent The Challenged Conduct**

182. Dr. Gentzkow claims that “consumers would plausibly be *worse off* in a but-for world where the challenged conduct was absent.”<sup>401</sup> Dr. Gentzkow speculates on what he views as various potential consequences of “reducing or eliminating Google’s ability to monetize its investments” in the but-for world, but does not opine on the likelihood or extent of any given outcome.<sup>402</sup> As I have explained, Google would remain highly profitable in the but-for world,<sup>403</sup>

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401. Gentzkow Report ¶635.

402. Gentzkow Report ¶637.

403. Singer Merits Report Part VI.H.

and increased competition in the but-for world would not cause Google to offset the lost revenue by charging even a modest fee on consumers, or by taking other measures to cut costs by reducing the scope, quality, or security of services provided by the Play Store.<sup>404</sup> To the contrary, lower prices would result in increased output;<sup>405</sup> consumers would also have benefitted further from enhancements to output, quality, and consumer choice in a more competitive but-for world.<sup>406</sup>

183. Like other Google Experts, Dr. Gentzkow claims that the Chinese market illustrates the perils of the but-for world. As explained in Part I.D above, Dr. Gentzkow and the Google Experts do not acknowledge the limits of intellectual property protection and the widespread practice of App scraping in the Chinese ecosystem, which together limit App developers' ability to command more favorable take rates. They also ignore the considerable regulatory burdens and the associated costs for Chinese app stores.

184. Dr. Gentzkow asserts that the Challenged Conduct has produced "enormous benefits" for Google to coordinate with other firms and that such coordination can be explained away as solving a collective action problem.<sup>407</sup> This is inconsistent with standard antitrust economics. When it comes to competing for App store distribution, OEMs and the mobile operators should be understood as potential horizontal competitors to Google. Antitrust prevents horizontal rivals (and would-be rivals) from coordinating because of the natural conflict between the rivals' joint interests (higher prices, lower output) and consumers' interests (lower prices, higher output). By contrast, antitrust law shows deference to firms that coordinate decision-making inside the firm's boundaries. For example, in the DC Circuit's opinion in *Microsoft*, interference with product design was rejected out of deference to Microsoft's business judgment.<sup>408</sup> It follows that Apple, as a vertically integrated firm, can impose restrictions on its handset manufacturers in ways that Google cannot vis-a-vis third-party handset providers.<sup>409</sup>

Dr. Gentzkow's claim that cross-firm coordination solves a purported "collective action problem" does not survive scrutiny. Horizontal rivals face collective action problems everywhere. Airline *A* would like to reduce capacity, but if it does so unilaterally, Airline *B* will steal traffic. If the two airlines can coordinate, they can solve the collective action problem. Although the airlines are better off, consumers are clearly worse off. Simply solving a collective action problem does not constitute an economically valid efficiency defense. Moreover, as explained in Part II.C.3, Dr. Gentzkow fails to demonstrate that the Challenged Conduct was necessary to prevent fragmentation (the specific type of coordination problem he alleges).

### III. DR. TUCKER FAILS TO UNDERMINE MY CONCLUSIONS

185. In my Merits Report, I defined the relevant product and geographic markets at issue using standard antitrust economics. Market definition turns on whether or not a hypothetical

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404. Singer Merits Report ¶¶401-404.

405. Singer Merits Report Part VI.G.

406. Singer Merits Report ¶3.

407. Gentzkow Report ¶634.

408. *United States v. Microsoft Corp.*, 253 F.3d 34, 67 (D.C. Cir. 2001).

409. Nor is Google economically analogous to manufacturer simply imposing vertical restrictions on a retailer of its products in order to promote intrabrand competition. The Challenged Conduct forecloses third-party rivals who would otherwise competitively supply products in relevant antitrust product markets within the Android ecosystem.

monopolist could profitably raise prices above competitive levels if it were the only seller of a given group of substitute products.<sup>410</sup> Market definition turns on demand substitution—that is, consumers’ willingness and ability (or lack thereof) to switch to products outside the relevant market in response to a price increase.<sup>411</sup> In other words, an economist draws a circle around a set of products and then evaluates the extent to which purchasers of that product would be willing and able to substitute to products outside of that circle in the event of a price increase above competitive levels.

186. I defined three relevant antitrust markets: the market for Licensable Mobile Operating Systems;<sup>412</sup> the Android App Distribution Market;<sup>413</sup> and the In-App Aftermarket.<sup>414</sup> I used two standard economic methods to demonstrate each of these markets constitutes a relevant antitrust market. I first used direct evidence<sup>415</sup> to establish that Google has already profitably held prices significantly above competitive levels in the Android App Distribution Market and the In-App Aftermarket, which means that Google has market power in these markets.<sup>416</sup>

187. I also used indirect evidence to propose and evaluate relevant antitrust product markets using the standard hypothetical monopolist test (“HMT”).<sup>417</sup> The HMT requires that a relevant antitrust product market contain enough substitute products such that a hypothetical monopolist that was the only present and future seller of those products could profitably impose a small but significant and non-transitory increase in price (“SSNIP”) above competitive levels.<sup>418</sup> If a candidate market contains too few substitute products for a hypothetical monopolist to profitably exercise a SSNIP, the relevant market is expanded by adding more substitute products

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410. Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines* (2010), §4.1.1 [hereafter, *Merger Guidelines*].

411. *Merger Guidelines*, §4. (“Market definition focuses solely on demand substitution factors, i.e., on customers’ ability and willingness to substitute away from one product to another in response to a price increase or a corresponding non-price change such as a reduction in product quality or service.”)

412. Singer Merits Report Part I.

413. Singer Merits Report Part II.

414. Singer Merits Report Part III.

415. Herbert Hovenkamp, *Digital Cluster Markets*, 1 COLUMBIA BUSINESS LAW REVIEW 246, 272 (2022) (“By contrast, ‘direct’ proof relies on estimates of firm elasticity of demand, evidenced mainly by a firm’s price-cost margins or output responses to price changes.[] These methodologies are capable of giving more accurate measures of market power as it is best defined---the ability of a firm to profit by raising its price above its costs[.]”) As Hovenkamp observes, “digital markets are particularly susceptible to direct measurements of market power that do not depend on a market definition.” *Id.* at 246.

416. See, e.g., Jonathan Baker & Timothy Bresnahan, *Economic Evidence in Antitrust: Defining Markets and Measuring Market Power in* PAOLO BUCCIROSSI, ED., HANDBOOK OF ANTITRUST ECONOMICS 1- 42 (MIT Press 2008) [hereafter Baker & Bresnahan], at 15. See also Aaron S. Edlin & Daniel L. Rubinfeld, *Exclusive or Efficient Pricing? The Big Deal Bundling of Academic Journals*, 72 ANTITRUST L.J. 119, 141 (2004) (“Market definition is only a traditional means to the end of determining whether power over price exists. Power over price is what matters...if power can be shown directly, there is no need for market definition: the value of market definition is in cases where power cannot be shown directly and must be inferred from sufficiently high market share in a relevant market.”). See also PHILLIP E. AREEDA, EINER ELHAUGE & HERBERT HOVENKAMP, 10 ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION 267, 325–28, ¶ 1758b. (1996 & Supp. 2003); see also PHILLIP AREEDA, LOUIS KAPLOW & AARON EDLIN, ANTITRUST ANALYSIS: PROBLEMS, TEXT AND CASES ¶ 344 (6th ed. 2004). See also *Merger Guidelines*, §4 (“[e]vidence of competitive effects can inform market definition[.]”).

417. *Merger Guidelines*, §4.1.1.

418. *Id.*



until a SSNIP becomes profitable.<sup>419</sup> The HMT is typically assessed using a five percent hypothetical price increase or SSNIP.<sup>420</sup> My market definition analysis is supported by empirical analyses to inform both the HMT and direct evidence of monopoly prices.<sup>421</sup> Consistent with standard practice, I also used qualitative evidence to inform my analysis.<sup>422</sup>

188. Dr. Tucker claims that the Play Store competes in a vast overarching megamarket, which she defines as the U.S. market for the “facilitation of digital content transactions.”<sup>423</sup> Dr. Tucker’s market definition includes all digital content transactions within the Android ecosystem,<sup>424</sup> as well as within the entire Apple ecosystem,<sup>425</sup> OEMs,<sup>426</sup> websites generally,<sup>427</sup> gaming platforms such as the Xbox, PlayStation, and Nintendo Switch, and PC platforms such as Steam and the Epic Games Store.<sup>428</sup>

189. If Dr. Tucker is to be believed, the Play Store has no ability to profitably increase prices above competitive levels, and it still could not do so unless Google were the sole monopolist over all the “ecosystems” that facilitate the provision of digital content, including the manufacture, sale, and payment for Android- and Apple-based mobile devices, PCs, gaming platforms, apps, and payment systems. By Dr. Tucker’s logic, the Department of Justice could allow megamergers of, for example, all PC manufacturers or all OEMs, or all entities in the Android ecosystem, without risking any significant diminution in competition.<sup>429</sup>

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419. *Id.* See also Department of Justice & Federal Trade Commission, Horizontal Merger Guidelines, *reprinted in* 4 Trade. Reg. Rep. ¶ 13,104, at § 1.11 (1992) (“If, in response to the price increase, the reduction in sales of the product would be large enough that a hypothetical monopolist would not find it profitable to impose such an increase in price, then the Agency will add to the product group the product that is the next-best substitute for the merging firm’s product...The price increase question is then asked for a hypothetical monopolist controlling the expanded product group. This process will continue until a group of products is identified such that a hypothetical monopolist over that group of products would profitably impose at least a “small but significant and nontransitory” increase [“SSNIP”], including the price of a product of one of the merging firms.”) See also Michael L. Katz and Carl Shapiro, *Critical Loss: Let’s Tell the Whole Story*, ANTITRUST 49 (2003) (“The now-standard procedure for defining relevant product markets in horizontal merger cases asks whether a hypothetical monopolist controlling a group of products would find it profitable to raise the price of at least one product significantly above the prevailing level.”).

420. Merger Guidelines §4.1.2 (“The Agencies most often use a SSNIP of five percent of the price paid by customers for the products or services to which the merging firms contribute value. However, what constitutes a ‘small but significant’ increase in price, commensurate with a significant loss of competition caused by the merger, depends upon the nature of the industry and the merging firms’ positions in it, and the Agencies may accordingly use a price increase that is larger or smaller than five percent.”).

421. Singer Merits Report ¶¶74-78

422. Singer Merits Report ¶¶79-85.

423. Tucker Report ¶¶94-98.

424. Dr. Tucker also alleges that apps can be sideloaded, pre-installed, or be downloaded through other Android App stores. This is subsumed within my Android App Distribution Market definition. See Singer Merits Report Part II.A.

425. Tucker Report ¶153.

426. Tucker Report ¶20

427. Tucker Report ¶218.

428. Tucker Report ¶276.

429. Dr. Tucker claims that Google’s recent take rate reductions are evidence of “direct price competition between the Google Play store and the Apple App Store” and is “not consistent with Google acquiring or maintaining monopoly power in the relevant market defined by Plaintiffs’ expert reports.” Tucker Report ¶¶462-466. Dr. Tucker

190. As detailed below, Dr. Tucker’s proposed megamarket of all digital content facilitation is fatally flawed and is divorced from standard antitrust economics.

191. Dr. Tucker ignores the elementary principle that antitrust product markets are defined using substitute products, not complementary products. For example, a Samsung device is obviously not a substitute for the Google Android mobile OS because consumers cannot respond to an increase in the price of one by substituting to the other. Yet Dr. Tucker lumps into her proposed relevant market complementary products that cannot be substitutes. Dr. Tucker also ignores the elementary antitrust principle that product markets are defined based on the smallest (not the largest) set of substitutes that a hypothetical monopolist would need to control to exercise market power.

192. Dr. Tucker does not perform an HMT or any other standard antitrust analysis to support her market definition. Dr. Tucker’s calculation of the Play Store’s ■■■ to ■■■ percent share of “consumer spending on digital transactions”<sup>430</sup> does not reflect the Play Store’s share of a coherently defined relevant antitrust market. Dr. Tucker’s analysis also suffers from the Cellophane fallacy, according to which markets may be defined too broadly if the economist fails to take into account that current prices are already above competitive levels, leading customers to substitute towards products that would not be considered economic substitutes if prices were at competitive levels.<sup>431</sup>

193. In Part III.A below, I explain the flaws in Dr. Tucker’s proposed market definition. I then explain in Parts III.B-III.C why Dr. Tucker’s specific critiques of my market definitions and my conclusions regarding Google’s monopoly power in these relevant markets are without merit and do not undermine my conclusions.

## **A. Dr. Tucker’s Proposed Megamarket Disregards Elementary Principles of Antitrust Economics**

### **1. A Relevant Antitrust Market Is Comprised of Substitutes, Not Complements**

194. Dr. Tucker’s market for the “facilitation of digital content transactions” fails the most basic requirements of a relevant antitrust market. The *Horizontal Merger Guidelines* clearly state that a properly defined antitrust market consists of products that a consumer would substitute in response to a price increase.<sup>432</sup> Dr. Tucker recognizes this principle in the opening discussion of her report:

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does not consider the possibility that Google’s recent take rate reductions could have been implemented in a bid to ward off potential litigation or regulation. *See, e.g.*, Rep. Buck Introduces the State Antitrust Enforcement Venue Act (May 21, 2021), available at <https://buck.house.gov/media-center/press-releases/rep-buck-introduces-state-antitrust-enforcement-venue-act> ; Klobuchar, Lee Bill to Empower State Antitrust Enforcers Passes Judiciary Committee (September 23, 2021), available at <https://www.klobuchar.senate.gov/public/index.cfm/news-releases?ID=FB43A176-4E1C-4B7E-944D-152FB01ED92F>.

430. Tucker Report ¶63; ¶520.

431. Luke Froeb & Gregory Werden, *The Reverse Cellophane Fallacy in Market Delineation*, 7 REVIEW OF INDUSTRIAL ORGANIZATION 241-247, 241 (1992).

432. Merger Guidelines, §4.

A relevant antitrust market must reflect the effective area of competition for the focal product or service, based on an analysis of the alternatives that are substitutable. These substitutes constrain the focal firm's ability to change price, quality or output in a way that benefits the firm and not consumers. For an economist, the set of competing products that define a relevant antitrust product market is the set of products that consumers would switch to if prices increase or quality is reduced relative to the price or quality that would prevail absent monopoly power.<sup>433</sup>

195. Two paragraphs later, Dr. Tucker claims that “the product in this case is the facilitation of digital content transactions—paid and unpaid—between users and developers.”<sup>434</sup> Dr. Tucker includes the entire Android and Apple ecosystems in her market definition; for example, all of Dr. Tucker's evidence in Part VI.A.1 of her report relate to the competition of Apple and Android phones, not the app stores. But the Android ecosystem (as well as the Apple ecosystem) contains many complementary products. Google Android, the operating system, is a complement to a smartphone. Apps and App Stores are complements to Google Android. Apps and App stores are also complementary to smartphones, and so on. Dr. Tucker's proposed market definition therefore fails from the outset.

196. Dr. Tucker claims that “[t]he concept of an ‘ecosystem’ makes clear that all parts of the system are related and must be considered together when analyzing competitive constraints.”<sup>435</sup> Dr. Tucker is wrong; she cites no authority or literature that supports this claim. Antitrust practitioners explicitly disavow including an entire “ecosystem” (or “commercial reality” justifications) in a relevant market. As explained by Professor Areeda in his antitrust treatise:

Grouping complementary goods into the same market is not only economic nonsense, it also undermines the rationale for the policy against monopolization or collusion in the first place. [M]any “commercial realities” describe a particular market situation, and their invocation should not become an after-the-fact rationalization for a conclusion that is completely inconsistent with the economic rationale for defining markets.<sup>436</sup>

The most charitable interpretation of Dr. Tucker's position is that Google has no incentive or ability to exercise power in one part of the ecosystem lest it negatively impact the whole ecosystem and thus its competitive position vis-à-vis Apple. But this is not an expression of the relevant antitrust product market, which is the *smallest* collection of *substitutes* such that a hypothetical monopolist could exercise market power. It is instead Dr. Tucker's speculation regarding some

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433. Tucker Report ¶7.

434. Tucker Report ¶9.

435. Tucker Report ¶14.

436. Areeda and Hovenkamp, *Cluster Markets and Two-Sided Platforms: Distinguishing Substitutes from Complements* in ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION (2022). *Id.* ¶565 (“As economists have long understood, a relevant market consists only of goods that are reasonably close substitutes for one another. The Supreme Court has indicated that relevant markets are composed of substitutes by defining market boundaries in terms of cross-elasticity of demand. That term speaks of the rate at which people will substitute one item in response to a price increase in a different item—a comparison that applies only to a relationship of substitution.”).

unrelated competitive constraint that purportedly operates at a different layer of the ecosystem. And if such a constraint exists, it has done nothing to prevent Google from imposing supra-competitive take rates on the Play Store.

197. Dr. Tucker claims incorrectly that I agree that “Android device users’ ability to choose iPhones and iPads competitively constrains Google in operating and pricing the Google Play store” because I relied on a Google document that references the Play Store’s contribution to “creating brand loyalty and ‘stickiness’ to Android and the Google ecosystem.”<sup>437</sup> Dr. Tucker wrongly conflates the limited competition between the Android and iOS operating systems at the time of a user’s initial device purchase with competition between the Play Store and Apple’s App Store once a user is locked into owning a device in one of those ecosystems. The Play Store may contribute to some OS-level stickiness by causing users to remain with Android at the time of their next device purchase, but that does not mean (as Dr. Tucker suggests) that the Play Store is competitively constrained in its pricing by that limited competition at the time of the initial device purchase. In fact, the document I cite supports my conclusion that there are substantial switching costs between Apple and Android devices, which contributes to the Play Store’s market power, as the Apple App Store obviously is not available on Android devices.<sup>438</sup> These switching costs reinforce Google’s monopoly power. Put differently, after the initial purchase of an Android phone, the customers are locked in, and they also have no real insight into lifecycle pricing for apps. Thus, any competition in that market does not constrain Google’s market power in the Android App Distribution Market.

## **2. A Relevant Antitrust Market Should Contain the Smallest Set of Substitutes Necessary To Exercise Market Power**

198. Dr. Tucker ignores the elementary principle that antitrust product markets are defined based on the *smallest* set of substitutes that a hypothetical monopolist would need to control to exercise market power.<sup>439</sup> The *Horizontal Merger Guidelines* give the following example for why defining a market too broadly might lead to misleading results:

Firms A and B, sellers of two leading brands of motorcycles, propose to merge. If Brand A motorcycle prices were to rise, some buyers would substitute to Brand B, and some others would substitute to cars. However, motorcycle buyers see Brand B motorcycles as much more similar to Brand A motorcycles than are cars. Far more cars are sold than motorcycles. Evaluating shares in a market that includes cars would greatly underestimate the competitive significance of Brand B

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437. Tucker Report ¶183, ¶184(d).

438. Singer Merits Report ¶52.

439. Merger Guidelines §4.1.1 (“Because the relative competitive significance of more distant substitutes is apt to be overstated by their share of sales, when the Agencies rely on market shares and concentration, they usually do so in the smallest relevant market satisfying the hypothetical monopolist test.”). *Id.* §4 (“Defining a market broadly to include relatively distant product or geographic substitutes can lead to misleading market shares. This is because the competitive significance of distant substitutes is unlikely to be commensurate with their shares in a broad market. Although excluding more distant substitutes from the market inevitably understates their competitive significance to some degree, doing so often provides a more accurate indicator of the competitive effects of the merger than would the alternative of including them and overstating their competitive significance as proportional to their shares in an expanded market.”)

motorcycles in constraining Brand A's prices and greatly overestimate the significance of cars.<sup>440</sup>

199. In her proposed market, Dr. Tucker includes products which “facilitate digital content transactions” such as websites and game consoles.<sup>441</sup> These do not belong in the relevant market because a hypothetical monopolist of App distribution on Android phones would not need to control them in order to exercise monopoly power.<sup>442</sup> If Google increased the price of the Play Store by some SSNIP, say by raising the take rate, developers (and their customers) would not move to websites and game consoles. Ultimately, whether or not consumers are willing and able to switch to an alternative product is an empirical question which is answered by the HMT, which I have performed for both the Android App Distribution Market and the In-App Aftermarket.<sup>443</sup>

### **3. The Relevant Antitrust Market Is Defined Solely Based on Demand-Side Substitution**

200. Dr. Tucker's market definition fails to incorporate the elementary antitrust principle that antitrust product markets are defined solely based on demand-side substitution—the demand response of developers or users—as opposed to the supply-side decisions of platform owners such as Google. As the *Merger Guidelines* explain:

Market definition focuses solely on demand substitution factors, i.e., on customers' ability and willingness to substitute away from one product to another in response to a price increase or a corresponding non-price change such as a reduction in product quality or service.<sup>444</sup>

Dr. Tucker acknowledges this principle in her report<sup>445</sup> but discards it in her market definition analysis. When defining the relevant market as the “facilitation of digital content transactions,” Dr. Tucker does not focus solely on demand substitution factors. Much of the focus in Dr. Tucker's market definition analysis is driven by (her view of) Google's (the supplier) views of the market.<sup>446</sup> The most charitable interpretation of her argument is that, when defining markets with a two-sided platform, one should consider both sides of the platform. I did so in my SSNIP tests for the Android App Distribution Market.<sup>447</sup>

### **4. Dr. Tucker's Proposed Megamarket Suffers from the Cellophane Fallacy**

201. Dr. Tucker's market definition analysis suffers from the Cellophane fallacy in that she fails to recognize that Google's take rate in the actual world reflects the exercise of significant

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440. Merger Guidelines §4.

441. Tucker Report ¶218, ¶276.

442. Singer Merits Report ¶101; ¶¶103-104.

443. Singer Merits Report Parts II.A.1 and III.A.3.

444. Merger Guidelines, §4.

445. Tucker Report ¶86.

446. See, e.g., Tucker Report Part III.B.1 (“The Relevant Product is the Facilitation of Digital Content Transactions”), ¶¶94-98.

447. Singer Merits Report Part II.A.1.



monopoly power.<sup>448</sup> Although Dr. Tucker mentions the Cellophane fallacy briefly in her report, her analysis proceeds without any further consideration of it.<sup>449</sup> In my Merits Report, I was careful to construct my HMT to avoid the Cellophane fallacy by imposing the SSNIP at the estimated competitive take rate, rather than the actual world take rate, which is a supracompetitive price.<sup>450</sup> If a market is already monopolized by an entity, more distant substitute products may appear to be closer substitutes than they would be in a competitive world. Because Google's take rate is far above the competitive take rate, as confirmed by my models and competitive benchmarks, we already know via direct evidence that Google has market power. That distant substitutes such as Apple's App Store might appear to be closer substitutes at Google's supra-competitive take rate is irrelevant.

## **B. Dr. Tucker's Critiques of My Market Definitions Are Without Merit**

202. In addition to her incorrect claim that Google competes in a single market for the facilitation of digital market transactions, Dr. Tucker offers some specific criticisms of how I define the three relevant antitrust markets in my Merits Report. As explained below, Dr. Tucker's criticisms do not undermine my conclusions.

203. It bears emphasis that although Dr. Tucker claims that my relevant markets are "arbitrarily defined" and "define away" the competition, Dr. Tucker does not dispute that I used standard antitrust market definition methods, such as the SSNIP and the HMT, to inform my market definition analysis.<sup>451</sup>

### **1. The Market For Licensable Mobile Operating Systems Is A Relevant Antitrust Product Market**

204. Dr. Tucker claims incorrectly that I "Misstate the Role of the Operating System in the Android Ecosystem."<sup>452</sup> According to Dr. Tucker, "By building the Android ecosystem and providing handset manufacturers with a high-quality operating system that is freely available, Google has enabled handset manufacturers as part of that mobile ecosystem to effectively compete with the Apple's tightly interconnected ecosystem...."<sup>453</sup> In other words, Dr. Tucker recognizes the elementary economic fact that Google Android and smartphones are complements, as opposed to substitutes. It follows that I was correct to exclude OEMs from the relevant market for licensable mobile OSs, and that Dr. Tucker was incorrect to lump them together in her proposed megamarket.

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448. *United States v. E. I. du Pont de Nemours & Co.*, 351 U.S. 377 (1956). See also Luke Froeb & Gregory Werden, *The Reverse Cellophane Fallacy in Market Delineation*, 7 REVIEW OF INDUSTRIAL ORGANIZATION 241-247, 241 (1992) ("In the landmark Cellophane case, the Supreme Court erroneously concluded that du Pont did not have significant market power because the Court evaluated the elasticity of demand for Cellophane at the monopoly equilibrium, at which the elasticity was far higher than at the competitive equilibrium."); see also Landes & Posner, *supra*, at 960-961.

449. Tucker Report ¶85.

450. Singer Merits Report ¶92.

451. Tucker Report ¶320 ("Separating Google's Android ecosystem into three arbitrarily defined discrete markets means that Plaintiffs' expert reports define away the Android ecosystem's competition with Apple and other alternatives that competitively constrain Android and the Google Play store.")

452. Tucker Report ¶¶322-326.

453. Tucker Report ¶323.

205. According to Dr. Tucker, “[c]laims that users do not switch across ecosystems after making their initial purchase decision are inconsistent with survey evidence.”<sup>454</sup> This misrepresents my opinion—I do not claim that switching across ecosystems never occurs; what I demonstrate is that there are substantial barriers to switching.<sup>455</sup> As Dr. Tucker concedes, Google’s own documents, including studies between 2016 and 2019, provide evidence of switching costs.<sup>456</sup> Dr. Tucker attempts to dismiss this evidence by suggesting that “learning costs from switching to Android or Apple have declined over time as the two operating systems have become more similar and have similar features.”<sup>457</sup> Put differently, Dr. Tucker concedes there is evidence of switching costs during the Class Period.<sup>458</sup> Finally, Dr. Tucker attempts to dismiss the evidence of switching costs by pointing out that rates of switching between iOS and Android are comparable to (though generally lower than) estimated rates of switching between brands of other consumer products, such as ketchup.<sup>459</sup> This argument is specious. The relatively low switching rate for these consumer products might be explained by other factors, such as consumer inertia; meanwhile, I have provided evidence that the low rates of switching between iOS and Android are the product of switching costs faced by consumers.<sup>460</sup>

206. As Dr. Tucker acknowledges, users with multiple devices are more likely to own devices within the same ecosystem; for example, an Apple iPhone owner may also own an iPad, a MacBook, and so on.<sup>461</sup> Dr. Tucker perversely interprets this as evidence against a separate market for licensable mobile operating systems; according to Dr. Tucker, if “iOS users are satisfied with Apple products and the Apple ecosystem,” this “would create a large incentive for Google to make the Android ecosystem competitive with the Apple ecosystem....”<sup>462</sup> This misses the point entirely. The evidence shows that the two ecosystems are differentiated and that switching between them is costly.

207. Based on Figures 10.A-B of her report, Dr. Tucker claims that Android’s share of U.S. sales has been declining relative to iOS, but this ignores more recent data, as shown below. The data also illustrate Android’s virtual monopoly on licensable mobile OSs.

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454. Tucker Report ¶331.

455. Singer Merits Report ¶¶46-55. Dr. Tucker cites an estimate for the switching rate among Tropicana orange juice, and asserts this shows evidence of comparable switching rates in a market “without any evidence of monopoly power.” Tucker Report ¶332. In fact, there is evidence of substantial upstream concentration in this market. *See* Peter Chung, “How Brazil stole the production of orange juice from Florida,” *CNBC* (August 23, 2018), (“Today, more than 50 percent of all orange juice bottled by major companies like Tropicana is supplied by a Brazilian company[.]”). Moreover, Tropicana is the market leader, accounting for about one third of the US refrigerated orange juice market. *See* <https://www.statista.com/statistics/660680/market-share-top-refrigerated-orange-juice-brands-united-states/>. Moreover, the published version of the article cited by Dr. Tucker for her Tropicana switching cost estimate explains that “consumers exhibit inertia in their brand choices, a form of psychological switching cost;” the authors of the study selected this market precisely because of the presence of non-trivial switching costs. Jean-Pierre Dubé et. al., *Do Switching Costs Make Markets Less Competitive?* 46(4) JOURNAL OF MARKETING RESEARCH (2009), at Abstract.

456. Tucker Report ¶335.

457. *Id.*

458. *See also* Tucker Report ¶337 (conceding that, according to a 2017 study, [REDACTED]).

459. Tucker Report ¶173.

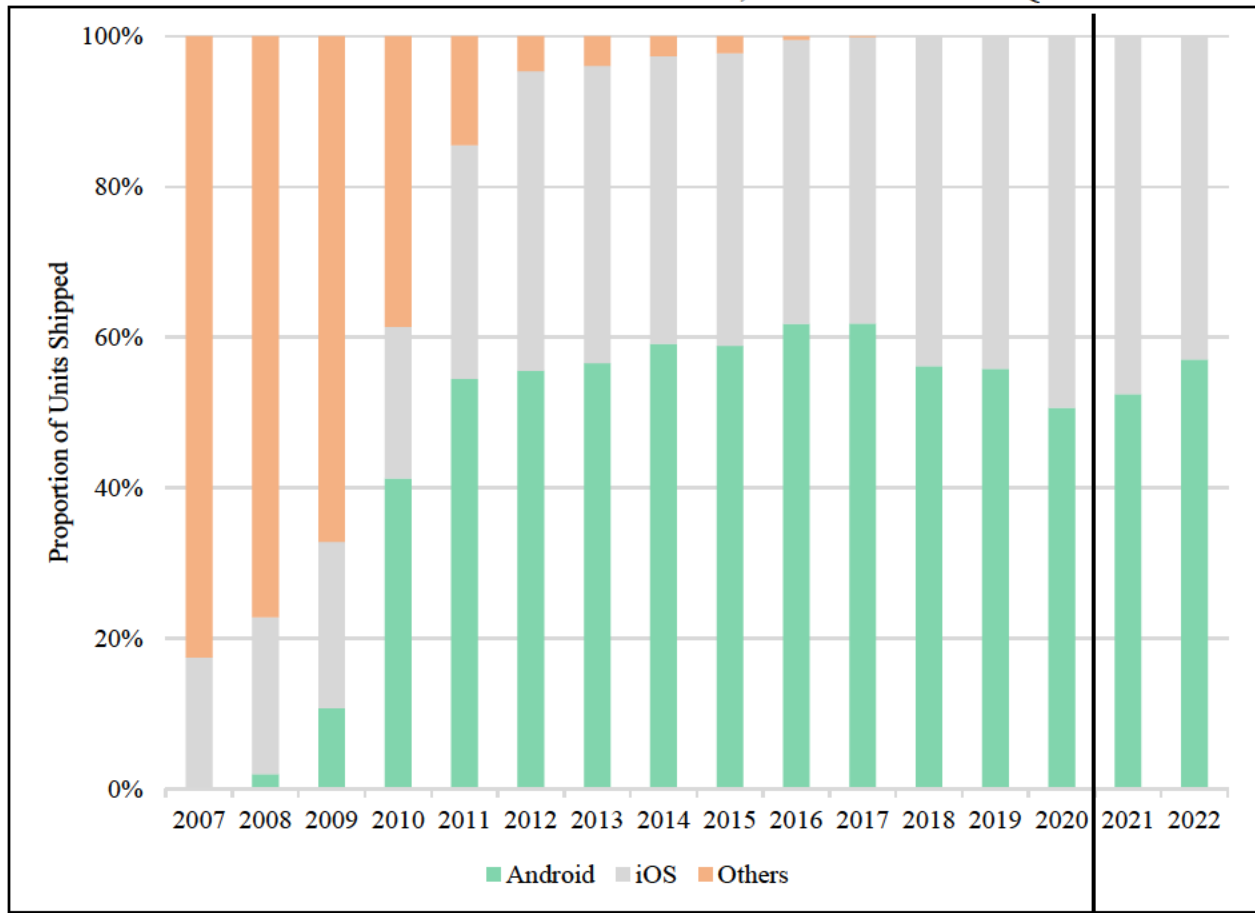
460. *See* Singer Merits Report ¶¶48-54.

461. Tucker Report ¶344.

462. *Id.*

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FIGURE 13: DR. TUCKER'S FIGURE 10.A, UPDATED THROUGH Q2 2022



Source: IDC Data.

Tucker Data Cutoff Point

The chart illustrates the changing landscape of mobile device expenditure over a 15-year period. In 2007, the market was dominated by 'Others' (orange), which accounted for nearly 80% of the share. By 2008, 'Others' still held a large share, but 'iOS' (grey) began to appear. From 2009 onwards, 'Android' (green) emerged as a significant player, and 'iOS' continued to grow. By 2010, 'Others' had dropped to around 33%, while 'Android' and 'iOS' were at 39% and 22% respectively. The share of 'Others' continued to decline, reaching near zero by 2015. 'Android' and 'iOS' both reached their peak shares of approximately 47% in 2013. Since 2014, the market has been dominated by 'Android' and 'iOS', with 'Android' generally holding a slightly larger share. A vertical line at 2020 marks the onset of the pandemic, after which the shares of 'Android' and 'iOS' remained relatively stable.

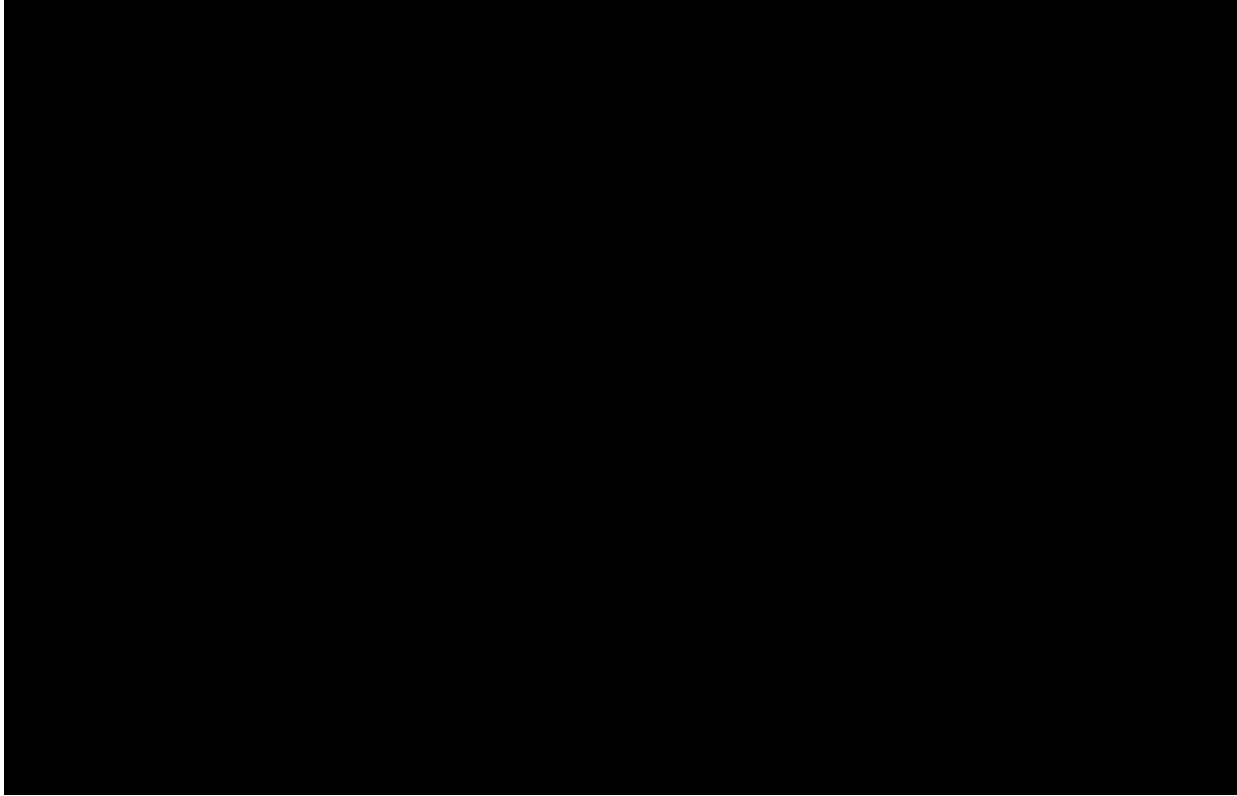
| Year | Android (%) | iOS (%) | Others (%) |
|------|-------------|---------|------------|
| 2007 | 0           | 22      | 78         |
| 2008 | 2           | 28      | 70         |
| 2009 | 10          | 29      | 61         |
| 2010 | 39          | 22      | 39         |
| 2011 | 44          | 45      | 11         |
| 2012 | 43          | 52      | 5          |
| 2013 | 47          | 47      | 6          |
| 2014 | 46          | 53      | 1          |
| 2015 | 42          | 57      | 1          |
| 2016 | 41          | 59      | 0          |
| 2017 | 37          | 63      | 0          |
| 2018 | 33          | 67      | 0          |
| 2019 | 34          | 66      | 0          |
| 2020 | 32          | 68      | 0          |
| 2021 | 31          | 69      | 0          |
| 2022 | 38          | 62      | 0          |

### Tucker Data Cutoff Point

209. Based on Figure 5 of her report, Dr. Tucker claims

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FIGURE 15: MONETIZATION STRATEGY OF TOP 100 DOWNLOADED APPS  
JANUARY 2015—MAY 2021



*Sources:* Tucker backup; Gentzkow backup; App Annie data (download amounts); App Catalog Data (monetization strategy). Top 100 downloaded apps defined as the 100 App Annie apps with the highest download counts per month that were capable of merging into the App Catalog Data. [REDACTED] of App Annie top 100 Play Store download monthly totals had a corresponding app package name within the App Catalog Data. Shares may not sum to 100% because apps can employ multiple monetization strategies. Monetization types are determined by the “has\_ads”, “is\_paid”, “has\_iap”, and “has\_subs” variables in the App Catalog Data. These variables reflect an app’s latest listed monetization strategy updated through May 2021 and may not reflect app monetization at the time of the release.

210. Dr. Tucker highlights evidence of “a relatively lower switching rate from the Apple ecosystem to the Android ecosystem, compared to switching rates from the Android ecosystem to the Apple ecosystem”<sup>464</sup> as if it were evidence against a separate market for licensable mobile operating systems. It is not, as there is no requirement that the relative switching rates must be equal (or at any predetermined ratio) for the two markets to be distinct.

211. As Dr. Tucker concedes, my Merits Report cited evidence of substantial differentiation between Google Android devices and Apple devices with respect to both pricing and features.<sup>465</sup> Dr. Tucker claims incorrectly that I ignore that “marginal customers can switch to Apple devices.”<sup>466</sup> Again, I do not claim that switching across ecosystems never occurs; what I demonstrate is that there are substantial barriers to switching, which is one of the factors helping

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464. Tucker Report ¶¶348-351.

465. Tucker Report ¶352.

466. *Id.*



to insulate the iOS and Google Android mobile OSs from head-to-head competition.<sup>467</sup> In any event, whatever switching or competition that may occur at the level of the device does not carry forward onto the Android App Distribution Market; once the customer has selected an Android-based device, switching to Apple's App Store in response to a SSNIP is no longer a practical option.

212. I explained in my Merits Report that the immense costs and complexities of developing a new mobile OS create barriers to entry, such that a SSNIP by a hypothetical monopolist of licensed operating systems would not plausibly induce an OEM to create its own system or a rival mobile OS developer to enter, and I provided evidence of these entry barriers.<sup>468</sup> Dr. Tucker agrees that "an operating system is indeed expensive and difficult to build."<sup>469</sup> Dr. Tucker claims I do not employ a "formal SSNIP test" in the market for licensable mobile operating systems,<sup>470</sup> but she ignores that it is standard practice to apply the conceptual framework of the HMT as I have done here.<sup>471</sup>

## **2. The Android App Distribution Market Is Separate From the In-App Aftermarket**

213. Dr. Tucker claims incorrectly that the Android App Distribution Market is not separate from the In-App Aftermarket because "defining a market limited to app distribution results in a market that consists almost entirely of free products."<sup>472</sup> I have explained in my Merits Report why Google finds it profitable to distribute free Apps and why it would continue to do so in the but-for world.<sup>473</sup> Dr. Tucker also overlooks the fact that it is not uncommon for software markets to comprise a large number of free transactions and for revenue to be earned from a smaller number of paid transactions.<sup>474</sup> Dr. Tucker further argues that because 97 percent of Apps are free, Google is entitled to monetize the provision of matchmaking by charging for In-App Aftermarket services, meaning that they are in the same market.<sup>475</sup> Google is only entitled to compete for

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467. Singer Merits Report ¶¶46-57. In Table 8 of her report (¶359), Dr. Tucker claims to show switching between the Android and iOS at various price points. However, these data show that switching from Android to iOS

Conversely, the data also show that switching from iOS to Android is about [REDACTED]. This provides further confirmation that each ecosystem is focused on different consumers at different price points.

468. Singer Merits Report ¶59. For example, Microsoft was estimated to have spent more than \$1 billion in developing and launching the Windows Phone, which has failed to make significant inroads into the licensable mobile OS market. *Id.*

469. Tucker Report ¶372.

470. Tucker Report Section VI.B.7 (header).

471. Merger Guidelines §4.1.3. ("Even when the evidence necessary to perform the hypothetical monopolist test quantitatively is not available, the conceptual framework of the test provides a useful methodological tool for gathering and analyzing evidence pertinent to customer substitution and to market definition.")

472. Tucker Report ¶375.

473. Singer Merits Report ¶¶401-404.

474. See Guadalupe Gonzalez, "Slack Makes 40 Percent of Its Revenue From Less than 1 Percent of Its Customers. Here's Why That Is Not as Bad as It Sounds," Inc. (April 29, 2019), [available at https://www.inc.com/guadalupe-gonzalez/slack-s1-business-model.html](https://www.inc.com/guadalupe-gonzalez/slack-s1-business-model.html) (noting that workplace messaging company Slack earns 40% of its revenue from "less than 0.1 percent of [its] total customer base" and that in 2018 videoconferencing software Zoom earned 30% of its more than \$300 million in revenue from 344 accounts).

475. Tucker Report ¶¶ 37, 133, 149-51, 375, 378, 381, 413(b).

business in the aftermarket; it is not entitled to capture that aftermarket exclusively and command a supra-competitive take rate. In the but-for world, Google would secure a majority of the In-App Aftermarket and it would command a price premium relative to its rivals. Accordingly, there is no reason a relevant market must be made up entirely or primarily of paid transactions, nor does Dr. Tucker provide one. Dr. Tucker's criticism thus fails to undermine my conclusion that a (not so) hypothetical monopolist that controlled the Android App Distribution Market could profitably exercise market power.

214. Dr. Tucker claims incorrectly that the In-App Aftermarket is defined too narrowly because:

[U]sers can use apps such as Candy Crush Saga, Tinder, and Pandora for free today, but can easily substitute to making in-app purchases or purchase a subscription version in the future. By the same logic, users who make payments in these apps today can easily stop making in-app purchases or cancel the subscription if prices were to rise in the future.<sup>476</sup>

This reasoning is incorrect. The fact that users can still benefit from a primary market if they abandon an aftermarket product due to a price increase does not mean that the aftermarket is part of the primary market. By Dr. Tucker's logic, there is no separate market for carwashes because car owners who currently choose to wash their car could instead opt to drive dirty cars if the price of carwashes went up.

215. Dr. Tucker claims incorrectly that the Android App Distribution Market is not separate from the In-App Aftermarket. According to Dr. Tucker, defining separate markets "does not make sense because the relationship between the two is important to Google's competitive strategy for the Google Play store."<sup>477</sup> This ignores standard antitrust economics that market definition is based solely on demand-side substitution, not on the "competitive strategy" of the supplier.

216. Dr. Tucker claims incorrectly that the Android App Distribution Market is not separate from the In-App Aftermarket because I cited industry data that aggregates revenues across the two markets.<sup>478</sup> That an industry analyst reported data in a certain way does not inform market definition and is in no way inconsistent with my conclusions. By this logic, an industry report with a table displaying aggregate U.S. auto sales would fatally undermine an economist's conclusion that a \$250,000 Tesla and a \$25,000 Ford EcoSport are not in the same relevant market.

217. Dr. Tucker quotes lines from my report out of context to support her argument that the Android App Distribution and In-App Aftermarket are not distinct. Dr. Tucker writes, "The Singer Report is not correct that the 'Play Store is not needed' after an initial download."<sup>479</sup> Dr. Tucker omits the end of this sentence, in which I wrote that the "Play Store is not needed *in these*

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476. Tucker Report ¶376.

477. Tucker Report ¶377.

478. Tucker Report ¶379.

479. Tucker Report ¶ 382.

*In-App Aftermarket services*, as the matchmaking function is not present.”<sup>480</sup> This discussion in my report was aimed at distinguishing the two-sided Android App Distribution Market, in which Google provides services to developers such as matchmaking, with the one-sided In-App Aftermarket, as the quoted section of my report explained, in which Google provides no similar valuable service for developers that they could not obtain elsewhere. Dr. Tucker nowhere establishes that the tasks she describes, such as updates for previously downloaded apps, are not properly considered to be part of just one of these two separate markets.<sup>481</sup>

### **3. The Android App Distribution Market Is A Relevant Antitrust Product Market**

218. In my Merits Report, I explained that, from a developer’s perspective, iOS and Android do not compete as “either-or” substitutes; a developer that restricted itself only to iOS would deprive itself of the revenue to be gained from accessing Android’s massive installed customer base (and vice-versa).<sup>482</sup> Dr. Tucker disputes this conclusion because, she claims, it “characterizes competition for developers as binary.”<sup>483</sup> Dr. Tucker does not explain how or why looking at competition in discrete versus continuous terms would alter the fact that developers rationally seek to maximize their reach across both platforms. Dr. Tucker provides no evidence that a SSNIP in the Android App Distribution Market would be unprofitable because it would be defeated by developers choosing to remove their Apps from the Android ecosystem and to offer their Apps only on iOS.

219. Dr. Tucker’s claim that “users multihome to access app content across different platforms, which reduces users’ switching costs and gives developers options to monetize their content on these platforms”<sup>484</sup> does not upset my market definition. If anything, that users multihome within the same game across different platforms indicates that the platforms are complements from the perspective of the user, which would be expected to reinforce platform complementarity from the developer’s perspective as well.

220. Dr. Tucker fails to acknowledge significant differences in gaming on mobile devices compared with other platforms. Developers approach mobile and PC gaming differently, reflecting system limitations and user expectations. For example, “mobile devices have limited storage space and processing power compared to gaming computers, so [developers] need to be mindful of these limitations[.]”<sup>485</sup> Additionally, users “expect shorter gameplay sessions on their phones or tablets, and they’re less likely to have the patience for complex games with a lot of rules.”<sup>486</sup>

221. Dr. Tucker focuses on recent innovations that might possibly serve to make mobile and PC gaming more substitutable in the future, but they have not been sufficiently developed or

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480. Singer Merits Report ¶ 143 (emphasis added).

481. Tucker ¶382.

482. Singer Merits Report ¶¶56-57.

483. Tucker Report ¶385.

484. Tucker Report ¶387.

485. Abhinay, *Difference Between Mobile and PC Game Development*, Juego Studio, September 5, 2022, available at <https://www.juegostudio.com/blog/difference-between-mobile-and-pc-game-development>.

486. *Id.*

deployed to have this effect during the Class Period. These new technologies include the Steam Deck and cloud gaming.<sup>487</sup> As Dr. Tucker concedes, Steam Deck was not launched until February 2022.<sup>488</sup> Dr. Tucker provides no analysis of any competitive effects of Steam Deck in the relevant markets at issue.<sup>489</sup> Similarly, cloud gaming is a recent technology. According to Dr. Tucker's Table 7, no cloud gaming system was available before November 2019, with most first appearing in 2020.<sup>490</sup> Dr. Tucker relies on revenue projections for 2024, as well as conjecture regarding the "potential" of the technology.<sup>491</sup> Industry reviews suggest that cloud gaming was still "in a transitional period" as of May 2022, and that "[c]loud gaming just isn't viable yet for many of the high-demand, high-speed AAA titles on the market[.]"<sup>492</sup> It has also been described as a "niche market" that is "unlikely to replace on-device gaming any time soon."<sup>493</sup>

222. Dr. Tucker's claim that web-based apps should be included in the relevant market is unpersuasive.<sup>494</sup> My Merits Report provided evidence (including but not limited to Google documents) showing that web-based apps have more limited functionality than native apps, including an inability to access the device camera or operate offline, and therefore cannot serve as a substitute for native Android apps.<sup>495</sup> Dr. Tucker does not engage with this evidence. Dr. Tucker provides no evidence that a SSNIP in the Android App Distribution Market would be unprofitable because it would be defeated by developers choosing to remove their Apps from the Play Store and offer only web-based Apps. In addition, the Challenged Conduct includes anti-steering provisions, further dampening the competitive significance of web-based Apps.<sup>496</sup>

223. In Figure 23 of her report, Dr. Tucker provides evidence that web-based Apps are not in the relevant market. In this figure, Dr. Tucker is trying to demonstrate that the native Tinder app and Tinder's "Progressive Web App" (PWA) have a similar appearance.<sup>497</sup> The screen capture of the billing screens shows that the web-based version of Tinder is priced at \$22.49, and the Play Store price is \$24.99, or 11.1 percent higher. That consumers are willing to pay a significant premium for the same App when distributed through the Play Store provides additional evidence

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487. Tucker Report §V.C.3.

488. Tucker Report ¶306.

489. *Id.*

490. Tucker Report Table 7.

491. Tucker Report ¶308 ; ¶310.

492. Kingston Technology, *What are the advantages and disadvantages of Cloud gaming?*, May 2022, available at <https://www.kingston.com/en/blog/gaming/cloud-gaming-advantages-disadvantages>.

493. Rupantar Guha, *What is cloud gaming and why does it matter?*, Verdict, October 21, 2022, available at <https://www.verdict.co.uk/what-is-cloud-gaming-and-why-does-it-matter/>.

494. Tucker Report ¶¶388-391.

495. Singer Merits Report ¶104.

496. Singer Merits Report ¶30.

497. Tucker Report ¶238. ("Web apps also should be included in the relevant market. Web apps represent technological improvements on the mobile apps. Unlike native apps, which are developed specifically for one platform and usually installed from an app store, web apps are accessed through a web browser. Gmail, Slack, Facebook, Tinder and Twitter are examples of apps that exist in both native and web app versions.")

that web-based Apps are not in the relevant market.<sup>498</sup> Moreover, the premium (11.1 percent) is above the usual five percent SSNIP used to define relevant markets.

224. In my Merits Report, I performed one-sided and two-sided SSNIP tests demonstrating that the Android App Distribution Market is a relevant antitrust product market.<sup>499</sup> Dr. Tucker claims incorrectly that my HMT is flawed because it “assumes Google’s pricing should be close to marginal cost.”<sup>500</sup> Relatedly, Dr. Tucker claims my HMT “ignores the fixed and investment costs in developing and operating an operating system and the Google Play store.”<sup>501</sup> In fact, I allow for Google to charge a take rate substantially above marginal cost, even in a more competitive but-for world. In the Android App Distribution Market, Google is estimated to earn a price-cost margin of [REDACTED] in the but-for world,<sup>502</sup> inclusive of the Play Store’s direct costs of sales and direct operating expenses.<sup>503</sup> Because my models allow for Google to charge substantial markup in the but-for world, Google would remain profitable even after accounting for early losses and fixed investment costs.<sup>504</sup> Dr. Tucker claims that Google’s financials are “not indicative of Google’s actual costs to sell an app,”<sup>505</sup> but fails to explain why or how Google’s P&L data is not an accurate reflection of its costs, or to identify any errors in my calculations.<sup>506</sup>

225. Dr. Tucker also claims that my SSNIP test is flawed because it assumes that “Google’s pricing decisions in the alleged Android app distribution market are independent and distinct from its operations outside of this alleged market.”<sup>507</sup> This is not a flaw; the SSNIP test is conducted using a hypothetical monopolist in the Android App Distribution Market. Google’s operations outside of the relevant market are irrelevant for purposes of conducting the SSNIP test.

226. Dr. Tucker critiques my (conservative) assumption that Google would retain a market share of 60 percent in the but-for world.<sup>508</sup> I have responded to this critique in Part I.B above.<sup>509</sup>

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498. The two other Tinder Gold subscription options also far exceed the 5% price increase benchmark. The 12-month option has a percentage increase of 11.1% [equal to  $(\$8.33 - \$7.50)/\$7.50$ ]. The 6-month option has a percentage increase of 11% [equal to  $(\$12.49 - \$11.25)/\$11.25$ ]. Additionally, my Merits report shows that Tinder’s other products, Tinder Plus and Tinder Platinum, both have prices approximately 10% higher when purchased through the Play Store instead of the web app. *See* Singer Merits Report ¶¶365 n.858.

499. Singer Merits Report ¶¶92-99.

500. Tucker Report ¶¶400-401.

501. Tucker Report Appendix I, at I.9 - I.10, ¶16.

502. Equal to [REDACTED]. *See* Singer Merits Report Table 6, rows [15] and [16].

503. Singer Merits Report ¶304, n. 683.

504. Mr. Chase’s calculations further confirm that the Play Store would remain profitable in the but-for world.

505. Tucker Report ¶404(a).

506. Dr. Tucker asserts that my calculation of the Play Store’s marginal cost akin to average costs and not indicative of the costs of an additional unit of output. *See* Tucker Report Appendix I at ¶¶7-18. If anything, this makes my analysis conservative: If Dr. Tucker were correct that Google’s marginal costs are [REDACTED] Tucker Report ¶402, this would imply that Google’s economies of scale are not exhausted, such that its marginal cost would be below its average costs.

507. Tucker Report ¶400.

508. Tucker Report ¶404(b).

509. Dr. Tucker asserts incorrectly that the regulatory environment in telecommunications makes AT&T’s market share an unsuitable benchmark. Tucker Report Appendix I, ¶21. In fact, my analysis uses AT&T’s market



#### 4. The In-App Aftermarket Is A Relevant Antitrust Product Market

227. Dr. Tucker suggests incorrectly that users and developers in the In-App Aftermarket are no more constrained than hotel guests that can “can choose to watch movies on their phone, tablet or PC.”<sup>510</sup> This analogy overlooks a few critical aspects of the In-App Aftermarket. *First*, a given app and its In-App content are not always consistently available from other sources. *Second*, even when the App and its In-App content is available on another platform, such as a console, this may require purchasing a console and/or the game. *Third*, even if the consumer were willing to incur these costs, many users, such as commuters who wish to play a game on the go, will not have a perfect substitute for the App and In-App Content on an Android device.

228. My Merits Report used a SSNIP test to confirm that the In-App Aftermarket is a relevant product market.<sup>511</sup> Dr. Tucker’s critiques of this SSNIP test are largely repetitive of her critiques of my SSNIP tests for Android App Distribution Market, to which I have responded in Part III.B.3 above.<sup>512</sup> In addition, Dr. Tucker critiques the econometric estimate I employ to model the competitive supply elasticity that Google would face in a more competitive but-for world.<sup>513</sup> I have responded to this critique in Part I.B above.<sup>514</sup>

229. Without citation to any authority, Dr. Tucker claims that my HMTs are flawed due to “the concentration of spending among certain high-value users.”<sup>515</sup> According to Dr. Tucker, “an analysis of the potential impacts of an increase in price or a decline in quality of the Google Play store would need to take into account the heterogeneous effects of those changes.”<sup>516</sup> Dr. Tucker offers no basis for this claim, or any hint as to how she believes the SSNIP test should or could be performed differently to account for this heterogeneity. There is heterogeneity in a wide range of industries, but this does not mean that standard HMTs cannot be applied to them. In addition, Google’s take rate structure is largely uniform and formulaic,<sup>517</sup> regardless of how heterogeneous users and developers may be.

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share in the deregulated long-distance market. Singer Merits Report ¶328. That the long-distance market was deregulated is precisely why economists have applied the Landes-Posner framework to it in published-peer reviewed research. *Id.* n. 750 (citing Simran Kahai, David Kaserman & John Mayo, *Is the “Dominant Firm” Dominant? An Empirical Analysis of AT&T’S Market Power*, 39 JOURNAL OF LAW & ECONOMICS 499-517 (1996)).

510. Tucker Report ¶410.

511. Singer Merits Report ¶151.

512. Tucker Report ¶413.

513. Tucker Report ¶414.

514. Dr. Tucker asserts that the “capacity of digital content providers, especially those that operate in digital platform settings, to increase output is dependent on much different constraints than what land-line telephone operators faced decades ago.” Tucker Report, Appendix I, ¶24. If anything, the supply elasticity of digital competitors in the In-App Aftermarket is likely greater than that in the long-distance market, in which physical infrastructure must be installed and expanded to serve more households. *See, e.g.*, Kahai et. al., *supra*, at 508, n. 23. This makes my analysis conservative, because Google would have even less pricing power in the but-for world if it faces a more elastic supply response from rivals.

515. Tucker Report ¶415.

516. Tucker Report ¶415.

517. *See, e.g.*, Singer Class Reply Figures 1-2.

## 5. Dr. Tucker's Claims On The Relevant Geographic Market Do Not Undermine My Conclusions

230. In my Merits Report, I explained that the relevant geographic market is global excluding China, where the Play Store is blocked. I further explained that (1) it is possible that a hypothetical monopolist in the Android App Distribution Market in the United States alone could profitably exercise market power; but (2) given the global reach of Google's monopoly power and the Challenged Conduct, for purposes of my analysis it is not necessary to limit the geographic market to the United States.<sup>518</sup>

231. Dr. Tucker claims the Google Play Store competes in a narrower geographic market limited to the United States.<sup>519</sup> Dr. Tucker's claim of a narrower geographic market relies on evidence that App stores may be designed for users of a particular country, language, currency, or targeted to users who share particular interests, as well as evidence that rivals such as the ONE Store are local to a specific country (e.g., Korea).<sup>520</sup> This does not change the fact that the Play Store (as well as the Apple App Store) have global reach, as do the Amazon Appstore and the Samsung Galaxy Store. And the fact that these global app stores translate their pages to local languages and show locally popular apps—as highlighted in Dr. Tucker's Figures 33-36—is irrelevant to determining the geographic market for these stores: it is entirely normal for companies competing in global markets to make local modifications to their product, such as how an international airlines will speak the local language and accommodate local dietary preferences. In any case, my conclusions do not hinge on whether the market is worldwide (excluding China) or limited to the U.S.

## C. Dr. Tucker's Report Fails To Show That Google Lacks Monopoly Power In The Relevant Markets At Issue

232. Dr. Tucker claims that “at launch, Google's service fees were set taking into account the service fees charged by Apple for digital content transactions.”<sup>521</sup> Dr. Tucker also cites Google's and Apple's more recent take rate cuts as evidence against Google's monopoly power.<sup>522</sup> That two firms in similar lines of business, each dominant in their respective relevant markets, would arrive at similar profit-maximizing prices is hardly evidence of competition. Dr. Tucker relies on testimony from Android founder Andy Rubin,<sup>523</sup> who also testified that,

[REDACTED]. This is consistent with my conclusion that Google exercised monopoly power in the Android App Distribution Market.<sup>524</sup>

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518. Singer Merits Report ¶¶109-110.

519. Tucker Report §VII.B.

520. Tucker Report ¶420.

521. Tucker Report ¶450.

522. Tucker Report ¶¶463-464.

523. Tucker Report ¶453 (citing Rubin Dep. 59:2:22).

524. Similarly, Dr. Tucker's Table 3 (showing similarity of pricing over time between Google and Apple) is consistent with two dominant firms reaching profit-maximizing prices in their respective markets. Similar logic also applies to Dr. Tucker's Figure 13 (showing similarity of features over time between Google and Apple); this merely provides evidence that the two dominant firm have charged similar quality-adjusted prices.

233. Dr. Tucker claims that monopoly power is absent because the Play Store's take rate has "declined over time."<sup>525</sup> In fact, the Play Store's aggregate take rate has been at or near [REDACTED] for most of the Class Period, the recent declines in the aggregate take have been modest, and Google's take rate remains far above competitive levels.<sup>526</sup>

234. Dr. Tucker claims that Google lacked monopoly power in the 2008-2009 timeframe when the Play Store's 30 percent take rate was adopted.<sup>527</sup> As I have explained in Part I.A, Google had an advantage at the outset of the Android Market due to its licensing of the Android operating system and its well-established dominance in search and other mobile functionality such as Google Maps.

235. Dr. Tucker claims that there have been improvements in "the services provided by the Google Play store," and that this is evidence against Google's monopoly power.<sup>528</sup> As I have explained in Part II.C.4 above, such trends are the norm for a wide range of tech markets, and this evidence does not undermine my conclusions regarding Google's monopoly power. Dr. Tucker's emphasis on increases in Play Points consumer subsidies over time<sup>529</sup> (relative to a starting level of zero) does not upset my conclusions. Google's aggregate consumer subsidy of [REDACTED] is far below that offered by the Amazon Appstore on third-party devices [REDACTED].<sup>530</sup>

236. Like the other Google Experts, Dr. Tucker claims that the Play Store's 30 percent take rate is similar to the rates of other platforms."<sup>531</sup> Dr. Tucker's benchmark take rates do not undermine my conclusions. Dr. Tucker relies on many of the same unsuitable benchmarks (PlayStation, Nintendo, Kindle Direct Publishing, etc.) as the other Google Experts. In Appendix 5, I summarize the various benchmarks offered by each of the Google Experts and I explain why they are unpersuasive.

237. Based on a slide showing [REDACTED], Dr. Tucker claims that "Google documents indicate that [REDACTED]."<sup>532</sup> Dr. Tucker provides no evidence that [REDACTED]. Moreover, the slide [REDACTED].

238. Dr. Tucker suggests incorrectly that my analysis "should consider prices on both sides of a two-sided transaction platform like the Google Play store to evaluate monopoly power and competitive effects."<sup>533</sup> In fact, my analysis accounts for pricing to both developers and consumers, as detailed in my Merits Report.<sup>534</sup>

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525. Tucker Report ¶450; ¶456; ¶463.

526. See, e.g., Figure 12, *supra*. Like all of the Google Experts, Dr. Tucker does not consider the possibility that Google's recent take rate cuts may have been implemented in response to anticipated litigation or regulation.

527. Tucker Report ¶47.

528. Tucker Report ¶456.

529. Tucker Report ¶457.

530. Singer Merits Report ¶420.

531. Tucker Report ¶458-460.

532. Tucker Report ¶461.

533. Tucker Report ¶467.

534. Singer Merits Report Part VI.B

239. My Merits Report explained that Google’s ability to price discriminate by charging different take rates to certain developers provides additional evidence of Google’s market power,<sup>535</sup> as does the fact that Google faces a downward-sloping demand curve.<sup>536</sup> Dr. Tucker acknowledges that the economic literature recognizes that “price discrimination may indicate some degree of market power,”<sup>537</sup> and that “a downward-sloping demand curve[] may indicate some degree of market power,”<sup>538</sup> but claims that this is not the case here. To support these claims, Dr. Tucker cites a paper that presumes “monopolistically competitive markets with modest locational or brand market power” to arrive at her preferred conclusion.<sup>539</sup> A monopolistically competitive market is one in which there are many firms competing to offer similar products to consumers.<sup>540</sup> These conditions do not apply here, as there are not many firms offering App distribution services on Android devices; those that do cannot provide effective competition due to the Challenged Conduct. In addition, Google’s market power is hardly locational or modest.

240. Dr. Tucker cites to an additional article to support her claim that “Google’s ability to price discriminate is not indicative of monopoly power.”<sup>541</sup> This article does not support Dr. Tucker’s claim; to the contrary, the authors embrace the standard economic inference that price discrimination cannot exist in the absence of market power. As the authors state in the introduction, economists have recognized for decades that “if there is price discrimination, there must be market power.”<sup>542</sup> The authors do not dispute this basic premise and instead focus on exploring the theoretical strength of the correlation between price discrimination and market power, using a simple, abstract, purely theoretical model.<sup>543</sup>

241. Dr. Tucker’s Table 12 lists examples of “app stores analyzed by Plaintiffs’ expert reports that charge different prices for different types of transactions on their platform;”<sup>544</sup> Dr. Tucker claims that “[e]vidence that firms without monopoly power charge different prices to different consumers illustrates that price discrimination does not by itself indicate monopoly power.”<sup>545</sup> Dr. Tucker ignores that price discrimination is defined as charging different prices to different customers for the same product or service.<sup>546</sup> For example, Dr. Tucker ignores that distribution of Microsoft’s Xbox console is not the same as distribution through the Microsoft

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535. Singer Merits Report ¶165.

536. Singer Merits Report ¶36.

537. Tucker Report ¶480.

538. Tucker Report ¶480.

539. Tucker Report ¶¶480-481, n. 919-920.

540. PINDYK & RUBENFELD, MICROECONOMICS 5<sup>th</sup> ed. (Prentice-Hall 2001), at 424-427.

541. Tucker Report ¶481, n. 920, citing Preston McAfee et. al., *Does large price discrimination imply great market power?* 92 ECONOMICS LETTERS 360-367 (2006).

542. McAfee et. al., *supra*, at 360 (“In a competitive market, price equals marginal cost. Wherever there is price discrimination, at least one of the prices deviates from the marginal cost. Therefore, if there is price discrimination, there must be market power. While this logic is sound, it has led many policy-makers to believe that price discrimination and market power are strongly positively correlated...” (citations omitted)).

543. *Id.*

544. Tucker Report ¶482.

545. Tucker Report ¶482.

546. ROBERT H. FRANK, MICROECONOMICS AND BEHAVIOR, 8<sup>th</sup> ed. (McGraw-Hill Irwin 2010) 393-395.



Store, and that distribution through a developer's URL is not the same as distribution through an App Store.<sup>547</sup>

242. I explained in my Merits Report that Google lacks sufficient market power to impose an aftermarket tie-in on developers selling physical goods or services (such as Uber).<sup>548</sup> But there are significant differences between the sale of physical goods from a mobile device and the sale of digital goods from a mobile device. For instance, there is no difference between the physical good purchased in an app and the same good purchased on the web or in a physical store; in contrast, Apps regularly do not exist on the mobile web at all, or lack certain capabilities when they do,<sup>549</sup> and cannot be purchased in physical stores. As a result, physical goods sellers and buyers can much more easily substitute purchases of physical goods away from Apps purchased through the Play Store, in response to an attempt by Google to charge supracompetitive prices. That Google is able to profitably impose a 30 percent take rate over one group of developers while charging a take rate of zero to another group is obvious evidence of Google's market power over the first group, in addition to evidence of its market power generally.

243. I explained in my Merits Report how network effects confer market power on the Play Store.<sup>550</sup> Dr. Tucker claims that a Google document is not supportive of this claim because it states that "[o]nce [Amazon has] their own critical mass of users and developers, they'll also benefit from network effects. At that point, it'll become much harder for us to compete."<sup>551</sup> Dr. Tucker is wrong; that the Amazon Appstore has yet to achieve anything beyond a miniscule market share indicates that Amazon has yet to reach the "critical mass" contemplated by the document. If anything, this provides additional evidence of the Play Store's entrenched network advantage. Relatedly, Dr. Tucker cites to literature purportedly showing that network effects for digital products are unlikely to lead to monopoly power.<sup>552</sup> But the evidence in this case shows that once

244. As Dr. Tucker concedes, my Merits Report relied in part on economic literature demonstrating how network effects can enhance and entrench monopoly power.<sup>553</sup> Dr. Tucker claims that these effects can be mitigated when users multi-home: "For example, the fact that a rider or driver can easily multihome across Uber and Lyft means that the platforms have to compete vigorously to attract both riders and drivers."<sup>554</sup> That is a poor economic analogy for the status quo in the presence of Challenged Conduct. Although multihoming may generate competition when users can choose among two side-by-side ride-hailing Apps on their device, each with a

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547. Tucker Report Table 12 (listing for the Microsoft Store a "5% commission for non-game and non-Xbox apps when users download an app through a direct URL," and listing for Aptoide a ten percent take rate "for developers distributing apps using their own channels.")

548. Singer Merits Report, n. 77.

549. Singer Merits Report ¶104.

550. Singer Merits Report ¶¶29, 82, 88, 135.

551. Tucker Report ¶49.

552. Tucker Report ¶¶53, 496-99, 509.

553. Tucker Report ¶495.

554. Tucker Report ¶499.



comparable fleet of vehicles and drivers, Google Play Store users have no comparable competitive alternative, particularly outside of Samsung devices. Due to the Challenged Conduct, would-be rival App stores do not offer a comparable quality and quantity of Apps, nor do they have the same reach as the Play Store. Dr. Tucker's claim that "users and developers who use Android and the Google Play store multihome extensively"<sup>555</sup> illustrates the inapplicability of the Uber/Lyft analogy. According to Dr. Tucker, this "extensive multihoming" includes Apple devices, web apps, websites and gaming consoles.<sup>556</sup> Dr. Tucker does not explain how effectively Lyft would compete with Uber if a consumer had to start up his or her Xbox, or purchase a new smartphone, in order to call a Lyft. More generally, she provides no analysis showing that the multihoming she purports to document in this case prevents Google from exercising monopoly power in the relevant markets at issue.

245. Dr. Tucker claims that "localized" competition "can impose a competitive constraint on a successful platform."<sup>557</sup> Yet Dr. Tucker does not establish that any "localized" competition prevents Google from exercising monopoly power in the relevant markets at issue; if such "localized" competition were sufficient to discipline Google's pricing power, then Google would not be able to command a supracompetitive take rate. Dr. Tucker asserts that gaming platforms "make Google vulnerable to having network effects run in a negative direction as a result of 'localized' competition,"<sup>558</sup> but does not demonstrate that this has occurred, or that gaming platforms have prevented Google from obtaining or exercising monopoly power in the relevant markets at issue.

246. Dr. Tucker claims that "Network effects can also lead to negative feedback loops as well as positive feedback loops. This means they lead to instability."<sup>559</sup> Dr. Tucker provides no analysis showing that negative feedback loops exist in the relevant markets at issue, let alone that they have caused "instability." The Play Store's dominant position has been quite stable for the duration of the Class Period, and before it.

247. Dr. Tucker claims incorrectly that the fact that output has increased over time in the Play Store demonstrates the absence of monopoly power.<sup>560</sup> As I have explained in Part II.C.4 above, this claim is incorrect.

248. In my Merits Report I explained that the ability to sustain high profit margins over extended time periods implies an ability to raise prices over competitive levels and therefore provides direct evidence of monopoly power.<sup>561</sup> Although Google has not produced comprehensive financials for Android, internal analyses in Google documents indicate that

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555. Tucker Report ¶499.

556. Tucker Report ¶499.

557. Tucker Report ¶501.

558. Tucker Report ¶508.

559. Tucker Report ¶502.

560. Tucker Report ¶¶516-517.

561. Singer Merits Report ¶83.

562. Singer Merits Report ¶¶83-85.

249. Dr. Tucker claims that “[c]osts reported in the Google Play store P&L statements used by Plaintiffs’ expert reports [REDACTED]

[REDACTED]<sup>563</sup>

[REDACTED]. This backward-looking perspective is irrelevant given the purpose of my analysis of the P&L statements, which was to measure the *going-forward* margin earned in the Play Store. For similar reasons, my alleged failure to examine Google’s R&D costs<sup>564</sup> is irrelevant for the task at hand. Dr. Tucker offers no evidence that Android is not highly profitable; to the contrary, she instead emphasizes Android’s success throughout her report,<sup>565</sup> and the available evidence indicates [REDACTED].<sup>566</sup>

250. Dr. Tucker criticizes me for not calculating profit margins separately for the Android App Distribution Market and the In-App Aftermarket. As explained in my Merits Report, the Play Store financials produced by Google [REDACTED]

[REDACTED]<sup>568</sup>

251. Dr. Tucker claims that the Play Store’s profit margins are “not informative about whether Google has monopoly power in the relevant markets”<sup>569</sup> because [REDACTED]

[REDACTED]<sup>570</sup> According to Dr. Tucker, [REDACTED]

[REDACTED]<sup>571</sup>

For example, in 2021 alone, the Play Store’s operating profit was [REDACTED], plus an additional [REDACTED]

[REDACTED]<sup>572</sup> Subtracting Google’s [REDACTED] from the Play Store’s [REDACTED] in operating profit in 2021 would leave the Play Store with operating profit of [REDACTED], with an operating profit margin of [REDACTED]

[REDACTED]<sup>573</sup> This calculation is merely illustrative; the effect would be diluted further if [REDACTED].

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563. Tucker Report ¶531.

564. Tucker Report ¶¶538-39.

565. *See, e.g.*, Tucker Report ¶67.

566. Singer Merits Report ¶¶83-85.

567. Singer Merits Report ¶173.

568. Tucker Report ¶532.

569. Tucker Report ¶536.

570. Tucker Report ¶536.

571. Tucker Report ¶541.

572. Singer Merits Report ¶138.

[REDACTED]. GOOG-PLAY-010371364 at -376.

573. GOOG-PLAY-010801682 ( [REDACTED]

#### IV. DR. SKINNER FAILS TO UNDERMINE MY CONCLUSIONS

252. Dr. Skinner critiques my calculations of the Play Store's profit because "Google Play internal management P&L [REDACTED]"

[REDACTED]<sup>574</sup> Dr. Skinner's claim is wrong, and would not undermine my conclusion if correct. *First*, the Play Store's P&Ls maintained in the ordinary course and produced by Google reflect cost allocations that Google deemed appropriate to measure the profitability of the Play Store.<sup>575</sup> *Second*, even if Dr. Skinner were correct that the P&Ls [REDACTED]

[REDACTED]<sup>576</sup> The fact that the Play Store benefits from costs shared with other Android businesses means that the Play Store enjoys economies of scope, which allows the Play Store to be more profitable than it could otherwise. Even if the data were available to implement Dr. Skinner's proposed approach, doing so would incorrectly ignore these scope economies. Put differently, the correct focus from an economic perspective is the incremental costs of the Play Store within the broader Android business, and not on the standalone cost that would be incurred by the Play Store in the absence of Android.<sup>577</sup> Analyzing Google Play as a "standalone" business, as Dr. Skinner suggests, would not make sense from an economic perspective. In both the actual and but-for world Google Play is part of Google, and there is no justification to measure Google Play's profit in a hypothetical world where it is not part of Google.

253. Dr. Skinner critiques my calculations of Android's profitability, which used Google's internal [REDACTED] analyses.<sup>578</sup> Dr. Skinner claims I failed to show that Google's [REDACTED] "capture all relevant costs needed to assess Android profitability."<sup>579</sup> But Google's own documents state that [REDACTED]

[REDACTED] Dr. Skinner emphasizes a disclaimer stating [REDACTED]

[REDACTED]<sup>581</sup> But that same disclaimer states that [REDACTED]

[REDACTED] Moreover, none of my conclusions hinge on the exact dollar amounts resulting from [REDACTED] analysis. The [REDACTED] is simply additional evidence that Android is profitable—consistent with the Google Experts' repeated emphasis on the success of Google specifically and the Android ecosystem generally. Dr. Skinner makes no attempt to contradict the other Google Experts by asserting that Android is not highly profitable,

574. Skinner Report ¶22.

575. See, e.g., GOOG-PLAY-000416245 ([REDACTED]). I understand that Michael Chase's analysis establishes from an accounting perspective that Play's ordinary course P&Ls are the appropriate measure of Google Play's profitability.

576. Skinner Report ¶22.

577. See, e.g., Gerald Faulhaber, *Cross-Subsidy Analysis with More Than Two Services*, 2 J. COMPETITION L. & ECON. 441 (2005). Dr. Skinner's analysis also ignores that Play's costs likely benefit other of Google's businesses on Android.

578. Singer Merits Report ¶¶83-85.

579. Skinner Report ¶24.

580. GOOG-PLAY-004503351.R at -352.R.

581. Skinner Report ¶197.

582. Skinner Report ¶197.

[REDACTED]

254. Finally, Dr. Skinner criticizes assertions that Google's margins are "high" because [REDACTED]

This criticism is divorced from any relevant economic framework. As Dr. Skinner's Table 1 shows, the "but-for" profits calculated by Mr. Chase based on my but-for world parameters are all lower than Google's actual margin in the respective years.<sup>584</sup> That the Play Store may have higher margins in the but-for world in 2021, as compared to the actual world in 2016, simply reflects that not all of the growth in Google's profit margins over time is attributable to the Challenged Conduct. This is in no way inconsistent with my opinions. Moreover, Dr. Skinner's analysis implicitly recognizes that Google would continue to earn a substantial profit in my but-for world.

#### CONCLUSION

255. For the foregoing reasons, the conclusions in my prior reports remain unaltered.

\* \* \*

Hal J. Singer, Ph.D.:



Executed on December 23, 2022.

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583. Skinner Report ¶162.

584. Skinner Report Table 1.

**APPENDIX 1: MATERIALS RELIED UPON****BATES DOCUMENTS**

AMZ-GP\_00002471, AMZ-GP\_00002484, AMZ-GP\_00003314, AMZ-GP\_00005705, GOOG-PLAY-000005029, GOOG-PLAY-000083999, GOOG-PLAY-000103456.R, GOOG-PLAY-000128863.R , GOOG-PLAY-000272539-699, GOOG-PLAY-000399013, GOOG-PLAY-000416245 , GOOG-PLAY-000416651, GOOG-PLAY-000443763, GOOG-PLAY-000443763.R, GOOG-PLAY-000451508, GOOG-PLAY-000451520, GOOG-PLAY-000463493 , GOOG-PLAY-000565846, GOOG-PLAY-000578247.R, GOOG-PLAY-000620210, GOOG-PLAY-000620638, GOOG-PLAY-000620996 , GOOG-PLAY-000621061-074, GOOG-PLAY-000621075-084 , GOOG-PLAY-000621139-148, GOOG-PLAY-000621177-189, GOOG-PLAY-000791152, GOOG-PLAY-000808464, GOOG-PLAY-000879069 , GOOG-PLAY-001026503, GOOG-PLAY-001090012-027, GOOG-PLAY-001265881, GOOG-PLAY-001388416-429, GOOG-PLAY-001388750-763, GOOG-PLAY-001547487, GOOG-PLAY-001745614, GOOG-PLAY-001745969-981, GOOG-PLAY-002425286 , GOOG-PLAY-003604122, GOOG-PLAY-004235359, GOOG-PLAY-004456799 , GOOG-PLAY-004494430.C, GOOG-PLAY-004503351.R , GOOG-PLAY-004541676, GOOG-PLAY-004694345, GOOG-PLAY-004697790.R, GOOG-PLAY-004708826, GOOG-PLAY-004728095.R, GOOG-PLAY-006367390, GOOG-PLAY-006381392.R, GOOG-PLAY-007203251, GOOG-PLAY-007379918, GOOG-PLAY-007380405, GOOG-PLAY-009261089, GOOG-PLAY-009911757, GOOG-PLAY-010371364 , GOOG-PLAY-010449493, GOOG-PLAY-010801682, GOOG-PLAY-010801683, GOOG-PLAY-011657415-425, GOOG-PLAY-011657425, GOOG-PLAY3-000018260, GOOG-PLAY4-000301527, GOOG-PLAY4-000804641 , GOOG-PLAY4-004260189, GOOG-PLAY4-007852650 , SEA\_EPICPRODUCTION\_002243,

**DEPOSITIONS**

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Deposition of Donn Morrill (Aug. 11, 2022)

Deposition of Hal Singer, PhD (May 12, 2022)

Deposition of Jamie Rosenberg (Feb. 10, 2022)

Deposition of Kirsten Rasanen (Aug. 17, 2022, Sep. 16, 2022)

Deposition of Purnima Kochikar (Aug. 31, 2022, Sep. 1, 2022)

Deposition of Sarah Karam (Sept. 28, 2022 – rough transcript)

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**APPENDIX 2: DR. LEONARD’S “REAL WORLD EXAMPLES” ADJUSTED FOR INFLATION**

APPENDIX TABLE A1: DR. LEONARD’S TABLE 1 USING REAL PRICES  
TOP 100 PAID APPS WITH 15 PERCENTAGE POINT TAKE RATE CHANGE (JULY 2020 VS. MAY 2022)

|  | Total | No Price Change* | Price Increase | Price Decrease |
|--|-------|------------------|----------------|----------------|
| <b><u>Based on Real List Price</u></b> |       |                  |                |                |
| Count of SKUs                          |       |                  |                |                |
| Consumer Spend (\$)                    |       |                  |                |                |
| Consumer Spend<br>(% of the Top 100)   |       |                  |                |                |
| Average Service Fee Rate               |       |                  |                |                |
| 2020.07.01 - 2021.06.30                |       |                  |                |                |
| 2021.07.01 - 2022.05.31                |       |                  |                |                |
| Average Real List Price                |       |                  |                |                |
| [Constant July 2020 Dollars]           |       |                  |                |                |
| 2020.07.01 - 2021.06.30                |       |                  |                |                |
| 2021.07.01 - 2022.05.31                |       |                  |                |                |
| % Real List Price Change               |       |                  |                |                |
| % Real List Price Change               |       |                  |                |                |
| 2020.07.01 - 2022.05.31                |       |                  |                |                |
| <b><u>Based on Real Net Price</u></b>  |       |                  |                |                |
| Count of SKUs                          |       |                  |                |                |
| Consumer Spend (\$)                    |       |                  |                |                |
| Consumer Spend<br>(% of the Top 100)   |       |                  |                |                |
| Average Service Fee Rate               |       |                  |                |                |
| 2020.07.01 - 2021.06.30                |       |                  |                |                |
| 2021.07.01 - 2022.05.31                |       |                  |                |                |
| Average Real Net Price                 |       |                  |                |                |
| [Constant July 2020 Dollars]           |       |                  |                |                |
| 2020.07.01 - 2021.06.30                |       |                  |                |                |
| 2021.07.01 - 2022.05.31                |       |                  |                |                |
| % Real Net Price Change                |       |                  |                |                |
| % Real Net Price Change                |       |                  |                |                |
| 2020.07.01 - 2022.05.31                |       |                  |                |                |

Sources: Leonard Backup; Google Play transactions data; GOOG-PLAY-007203251; GOOG-PLAY3-000018260; FRED, *Consumer Price Index for All Urban Consumers: All Items in U.S. City Average*, available at <https://fred.stlouisfed.org/series/CPIAUCSL>. Prices adjusted for inflation using CPI with base month 7/2020.

\*Consistent with Dr. Leonard, I treat any app whose *real* price changes by less than or equal to 1 percent as having “No Price Change”. These apps could still have experienced a nominal price increase. For instance, if inflation during a month is 1% and a given app’s price rises by 1%, then its nominal price increases by 1% while its real price stays constant at 0%.

APPENDIX TABLE A2: DR. LEONARD'S TABLE 2 USING REAL PRICE  
PRICE CHANGES OF THE TOP 100 PAID APPS WITH A SERVICE FEE RATE REDUCTION OF AT LEAST  
10 PERCENTAGE POINTS IN JULY 2021 (JULY 2020 VS. MAY 2022)

|  | Total | No Price<br>Change* | Price Increase | Price Decrease |
|--|-------|---------------------|----------------|----------------|
| <b><u>Based on Real List Price</u></b> |       |                     |                |                |
| Count of SKUs                          |       |                     |                |                |
| Consumer Spend (\$)                    |       |                     |                |                |
| Consumer Spend<br>(% of the Top 100)   |       |                     |                |                |
| Average Service Fee Rate               |       |                     |                |                |
| 2020.07.01 - 2021.06.30                |       |                     |                |                |
| 2021.07.01 - 2022.05.31                |       |                     |                |                |
| Average Real List Price                |       |                     |                |                |
| [Constant July 2020 Dollars]           |       |                     |                |                |
| 2020.07.01 - 2021.06.30                |       |                     |                |                |
| 2021.07.01 - 2022.05.31                |       |                     |                |                |
| % Real List Price Change               |       |                     |                |                |
| % Real List Price Change               |       |                     |                |                |
| 2020.07.01 - 2022.05.31                |       |                     |                |                |
| <b><u>Based on Real Net Price</u></b>  |       |                     |                |                |
| Count of SKUs                          |       |                     |                |                |
| Consumer Spend (\$)                    |       |                     |                |                |
| Consumer Spend<br>(% of the Top 100)   |       |                     |                |                |
| Average Service Fee Rate               |       |                     |                |                |
| 2020.07.01 - 2021.06.30                |       |                     |                |                |
| 2021.07.01 - 2022.05.31                |       |                     |                |                |
| Average Real Net Price                 |       |                     |                |                |
| [Constant July 2020 Dollars]           |       |                     |                |                |
| 2020.07.01 - 2021.06.30                |       |                     |                |                |
| 2021.07.01 - 2022.05.31                |       |                     |                |                |
| % Real Net Price Change                |       |                     |                |                |
| % Real Net Price Change                |       |                     |                |                |
| 2020.07.01 - 2022.05.31                |       |                     |                |                |

Sources: See Table A1, *supra*.

APPENDIX TABLE A3: DR. LEONARD'S TABLE 3 USING REAL PRICE CHANGES, TOP 100 PAID APPS  
(JULY 2020 – JULY 2021 vs. JULY 2021 – MAY 2022)

|  | Total | No Price<br>Change* | Price Increase | Price Decrease |
|--|-------|---------------------|----------------|----------------|
| <b><u>Based on Real List Price</u></b> |       |                     |                |                |
| Count of SKUs                          |       |                     |                |                |
| Consumer Spend (\$)                    |       |                     |                |                |
| Consumer Spend<br>(% of the Top 100)   |       |                     |                |                |
| Average Service Fee Rate               |       |                     |                |                |
| 2020.07.01 - 2021.06.30                |       |                     |                |                |
| 2021.07.01 - 2022.05.31                |       |                     |                |                |
| Average Real List Price                |       |                     |                |                |
| [Constant July 2020 Dollars]           |       |                     |                |                |
| 2020.07.01 - 2021.06.30                |       |                     |                |                |
| 2021.07.01 - 2022.05.31                |       |                     |                |                |
| % Real List Price Change               |       |                     |                |                |
| <b><u>Based on Real Net Price</u></b>  |       |                     |                |                |
| Count of SKUs                          |       |                     |                |                |
| Consumer Spend (\$)                    |       |                     |                |                |
| Consumer Spend<br>(% of the Top 100)   |       |                     |                |                |
| Average Service Fee Rate               |       |                     |                |                |
| 2020.07.01 - 2021.06.30                |       |                     |                |                |
| 2021.07.01 - 2022.05.31                |       |                     |                |                |
| Average Real Net Price                 |       |                     |                |                |
| [Constant July 2020 Dollars]           |       |                     |                |                |
| 2020.07.01 - 2021.06.30                |       |                     |                |                |
| 2021.07.01 - 2022.05.31                |       |                     |                |                |
| % Real Net Price Change                |       |                     |                |                |

*Sources:* See Table A1, *supra*. Since some of these apps are not recorded in both 7/2020 and 5/2022, I do not include the percentage change between these two months as in my other tables. \*Consistent with Dr. Leonard, I treat any app whose *real* price changes by less than or equal to 1 percent as having “No Price Change”. These apps could still have experienced a nominal price increase. For instance, if inflation during a month is 1% and a given app’s price rises by 1%, then its nominal price increases by 1% while its real price stays constant at 0%.

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APPENDIX TABLE A4: DR. LEONARD'S TABLE 4 USING REAL PRICES  
PRICE CHANGES OF THE TOP 100 IAPs WITH A FLAT SERVICE FEE RATE REDUCTION OF 15  
PERCENTAGE POINTS AFTER JULY 2021  
(JULY 2020 VS. MAY 2022)

|   | Total | No Price<br>Change* | Price Increase | Price Decrease |
|---|-------|---------------------|----------------|----------------|
| <b><u>Based on Real List Price</u></b>  |       |                     |                |                |
| Count of SKUs   |       |                     |                |                |
| Consumer Spend (\$)   |       |                     |                |                |
| Consumer Spend<br>(% of the Top 100)  |       |                     |                |                |
| Average Service Fee Rate<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31  |       |                     |                |                |
| Average Real List Price<br>[Constant July 2020 Dollars]<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31<br>% Real List Price Change |       |                     |                |                |
| % Real List Price Change<br>2020.07.01 - 2022.05.31   |       |                     |                |                |
| <b><u>Based on Real Net Price</u></b>   |       |                     |                |                |
| Count of SKUs   |       |                     |                |                |
| Consumer Spend (\$)   |       |                     |                |                |
| Consumer Spend<br>(% of the Top 100)  |       |                     |                |                |
| Average Service Fee Rate<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31  |       |                     |                |                |
| Average Real Net Price<br>[Constant July 2020 Dollars]<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31<br>% Real Net Price Change   |       |                     |                |                |
| % Real Net Price Change<br>2020.07.01 - 2022.05.31  |       |                     |                |                |

Sources: See Table A1, *supra*.



APPENDIX TABLE A5: DR. LEONARD'S TABLE 5 USING REAL PRICES  
PRICE CHANGES OF THE TOP 100 IAPs WITH A SERVICE FEE RATE REDUCTION OF AT LEAST 10  
PERCENTAGE POINTS IN JULY 2021 (JULY 2020 VS. MAY 2022)

|   | Total | No Price<br>Change* | Price Increase | Price Decrease |
|---|-------|---------------------|----------------|----------------|
| <b><u>Based on Real List Price</u></b>  |       |                     |                |                |
| Count of SKUs   |       |                     |                |                |
| Consumer Spend (\$)   |       |                     |                |                |
| Consumer Spend<br>(% of the Top 100)  |       |                     |                |                |
| Average Service Fee Rate<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31  |       |                     |                |                |
| Average Real List Price<br>[Constant July 2020 Dollars]<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31<br>% Real List Price Change |       |                     |                |                |
| % Real List Price Change<br>2020.07.01 - 2022.05.31   |       |                     |                |                |
| <b><u>Based on Real Net Price</u></b>   |       |                     |                |                |
| Count of SKUs   |       |                     |                |                |
| Consumer Spend (\$)   |       |                     |                |                |
| Consumer Spend<br>(% of the Top 100)  |       |                     |                |                |
| Average Service Fee Rate<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31  |       |                     |                |                |
| Average Real Net Price<br>[Constant July 2020 Dollars]<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31<br>% Real Net Price Change   |       |                     |                |                |
| % Real Net Price Change<br>2020.07.01 - 2022.05.31  |       |                     |                |                |

Sources: See Table A1, *supra*.

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APPENDIX TABLE A6: DR. LEONARD’S “REAL-WORLD EXAMPLES” FOR SUBSCRIPTIONS WITH REAL PRICES; PRICE CHANGES OF THE TOP 100 SUBSCRIPTIONS WITH A FLAT SERVICE FEE RATE REDUCTION OF 15 PERCENTAGE POINTS AFTER JULY 2021 (JULY 2020 VS. MAY 2022)

|  | Total | No Price Change* | Price Increase | Price Decrease |
|--|-------|------------------|----------------|----------------|
| <b><u>Based on Real List Price</u></b> |       |                  |                |                |
| Count of SKUs                          |       |                  |                |                |
| Consumer Spend (\$)                    |       |                  |                |                |
| Consumer Spend                         |       |                  |                |                |
| (% of the Top 100)                     |       |                  |                |                |
| Average Service Fee Rate               |       |                  |                |                |
| 2020.07.01 - 2021.06.30                |       |                  |                |                |
| 2021.07.01 - 2022.05.31                |       |                  |                |                |
| Average Real List Price                |       |                  |                |                |
| [Constant July 2020 Dollars]           |       |                  |                |                |
| 2020.07.01 - 2021.06.30                |       |                  |                |                |
| 2021.07.01 - 2022.05.31                |       |                  |                |                |
| % Real List Price Change               |       |                  |                |                |
| % Real List Price Change               |       |                  |                |                |
| 2020.07.01 - 2022.05.31                |       |                  |                |                |
| <b><u>Based on Real Net Price</u></b>  |       |                  |                |                |
| Count of SKUs                          |       |                  |                |                |
| Consumer Spend (\$)                    |       |                  |                |                |
| Consumer Spend                         |       |                  |                |                |
| (% of the Top 100)                     |       |                  |                |                |
| Average Service Fee Rate               |       |                  |                |                |
| 2020.07.01 - 2021.06.30                |       |                  |                |                |
| 2021.07.01 - 2022.05.31                |       |                  |                |                |
| Average Real Net Price                 |       |                  |                |                |
| [Constant July 2020 Dollars]           |       |                  |                |                |
| 2020.07.01 - 2021.06.30                |       |                  |                |                |
| 2021.07.01 - 2022.05.31                |       |                  |                |                |
| % Real Net Price Change                |       |                  |                |                |
| % Real Net Price Change                |       |                  |                |                |
| 2020.07.01 - 2022.05.31                |       |                  |                |                |

Sources: Leonard Backup; Google Play transactions data; GOOG-PLAY-007203251; GOOG-PLAY3-000018260; FRED, *Consumer Price Index for All Urban Consumers: All Items in U.S. City Average*, available at <https://fred.stlouisfed.org/series/CPIAUCSL>. Prices adjusted for inflation using CPI with base month 7/2020. \*Consistent with Dr. Leonard, I treat any app whose *real* price changes by less than or equal to 1 percent as having “No Price Change”. These apps could still have experienced a nominal price increase. For instance, if inflation during a month is 1% and a given app’s price rises by 1%, then its nominal price increases by 1% while its real price stays constant at 0%.

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APPENDIX TABLE A7: DR. LEONARD’S “REAL-WORLD EXAMPLES” FOR SUBSCRIPTIONS WITH REAL PRICES; PRICE CHANGES OF THE TOP 100 SUBSCRIPTIONS WITH A SERVICE FEE RATE REDUCTION OF AT LEAST 10 PERCENTAGE POINTS IN JULY 2021 (JULY 2020 VS. MAY 2022)

|  | Total | No Price | Price Increase | Price Decrease |
|--|-------|----------|----------------|----------------|
| <b><u>Based on Real List Price</u></b> |       |          |                |                |
| Count of SKUs                          |       |          |                |                |
| Consumer Spend (\$)                    |       |          |                |                |
| Consumer Spend                         |       |          |                |                |
| (% of the Top 100)                     |       |          |                |                |
| Average Service Fee Rate               |       |          |                |                |
| 2020.07.01 - 2021.06.30                |       |          |                |                |
| 2021.07.01 - 2022.05.31                |       |          |                |                |
| Average Real List Price                |       |          |                |                |
| [Constant July 2020 Dollars]           |       |          |                |                |
| 2020.07.01 - 2021.06.30                |       |          |                |                |
| 2021.07.01 - 2022.05.31                |       |          |                |                |
| % Real List Price Change               |       |          |                |                |
| % Real List Price Change               |       |          |                |                |
| 2020.07.01 - 2022.05.31                |       |          |                |                |
| <b><u>Based on Real Net Price</u></b>  |       |          |                |                |
| Count of SKUs                          |       |          |                |                |
| Consumer Spend (\$)                    |       |          |                |                |
| Consumer Spend                         |       |          |                |                |
| (% of the Top 100)                     |       |          |                |                |
| Average Service Fee Rate               |       |          |                |                |
| 2020.07.01 - 2021.06.30                |       |          |                |                |
| 2021.07.01 - 2022.05.31                |       |          |                |                |
| Average Real Net Price                 |       |          |                |                |
| [Constant July 2020 Dollars]           |       |          |                |                |
| 2020.07.01 - 2021.06.30                |       |          |                |                |
| 2021.07.01 - 2022.05.31                |       |          |                |                |
| % Real Net Price Change                |       |          |                |                |
| % Real Net Price Change                |       |          |                |                |
| 2020.07.01 - 2022.05.31                |       |          |                |                |

Sources: Leonard Backup; Google Play transactions data; GOOG-PLAY-007203251; GOOG-PLAY3-000018260; FRED, *Consumer Price Index for All Urban Consumers: All Items in U.S. City Average*, available at <https://fred.stlouisfed.org/series/CPIAUCSL>. Prices adjusted for inflation using CPI with base month 7/2020. \*Consistent with Dr. Leonard, I treat any app whose *real* price changes by less than or equal to 1 percent as having “No Price Change”. These apps could still have experienced a nominal price increase. For instance, if inflation during a month is 1% and a given app’s price rises by 1%, then its nominal price increases by 1% while its real price stays constant at 0%.

APPENDIX TABLE A8: DR. LEONARD'S "REAL-WORLD EXAMPLES" FOR SUBSCRIPTIONS WITH  
REAL PRICES; PRICE CHANGES OF THE TOP 100 SUBSCRIPTIONS  
(JULY 2020 – JULY 2021 VS. JULY 2021 – MAY 2022)

|   | Total | No Price<br>Change* | Price Increase | Price Decrease |
|---|-------|---------------------|----------------|----------------|
| <b><u>Based on Real List Price</u></b>  |       |                     |                |                |
| Count of SKUs   |       |                     |                |                |
| Consumer Spend (\$)   |       |                     |                |                |
| Consumer Spend<br>(% of the Top 100)  |       |                     |                |                |
| Average Service Fee Rate<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31  |       |                     |                |                |
| Average Real List Price<br>[Constant July 2020 Dollars]<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31<br>% Real List Price Change |       |                     |                |                |
| <b><u>Based on Real Net Price</u></b>   |       |                     |                |                |
| Count of SKUs   |       |                     |                |                |
| Consumer Spend (\$)   |       |                     |                |                |
| Consumer Spend<br>(% of the Top 100)  |       |                     |                |                |
| Average Service Fee Rate<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31  |       |                     |                |                |
| Average Real Net Price<br>[Constant July 2020 Dollars]<br>2020.07.01 - 2021.06.30<br>2021.07.01 - 2022.05.31<br>% Real Net Price Change   |       |                     |                |                |

*Sources:* Leonard Backup; Google Play transactions data; GOOG-PLAY-007203251; GOOG-PLAY3-000018260; FRED, *Consumer Price Index for All Urban Consumers: All Items in U.S. City Average*, available at <https://fred.stlouisfed.org/series/CPIAUCSL>. Prices adjusted for inflation using CPI with base month 7/2020. I use the same methodology as Dr. Leonard of including all top 100 apps by consumer expenditure that had at least 1 month occurring in both the pre- and post-rate reduction period. Since some of these apps are not recorded in both 7/2020 and 5/2022, I do not include the percentage change between these two months as in my other tables. \*Consistent with Dr. Leonard, I treat any app whose *real* price changes by less than or equal to 1 percent as having "No Price Change". These apps could still have experienced a nominal price increase. For instance, if inflation during a month is 1% and a given app's price rises by 1%, then its nominal price increases by 1% while its real price stays constant at 0%.

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**APPENDIX 3: LINEAR DEMAND DOES NOT FIT THE DATA WELL**

|                             | (1)<br>OLS           | (2)<br>IV         |
|-----------------------------|----------------------|-------------------|
|                             | Linear Demand        | Linear Demand     |
| App Category                | Price<br>Coefficient | Price Coefficient |
| <i>Art &amp; Design</i>     |                      |                   |
| <i>Auto &amp; Vehicles</i>  |                      |                   |
| <i>Beauty</i>               |                      |                   |
| <i>Books &amp; Ref</i>      |                      |                   |
| <i>Business</i>             |                      |                   |
| <i>Comics</i>               |                      |                   |
| <i>Communication</i>        |                      |                   |
| <i>Dating</i>               |                      |                   |
| <i>Education</i>            |                      |                   |
| <i>Entertainment</i>        |                      |                   |
| <i>Events</i>               |                      |                   |
| <i>Finance</i>              |                      |                   |
| <i>Food &amp; Drink</i>     |                      |                   |
| <i>Game</i>                 |                      |                   |
| <i>Health &amp; Fitness</i> |                      |                   |
| <i>House &amp; Home</i>     |                      |                   |
| <i>Library &amp; Demo</i>   |                      |                   |
| <i>Lifestyle</i>            |                      |                   |
| <i>Maps &amp; Nav</i>       |                      |                   |



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|                           | (1)<br>OLS        | (2)<br>IV         |
|---------------------------|-------------------|-------------------|
|                           | Linear Demand     | Linear Demand     |
| App Category              | Price Coefficient | Price Coefficient |
| <i>Medical</i>            |                   |                   |
| <i>Music &amp; Audio</i>  |                   |                   |
| <i>News &amp; Mag</i>     |                   |                   |
| <i>Parenting</i>          |                   |                   |
| <i>Personalization</i>    |                   |                   |
| <i>Photography</i>        |                   |                   |
| <i>Productivity</i>       |                   |                   |
| <i>Shopping</i>           |                   |                   |
| <i>Social</i>             |                   |                   |
| <i>Sports</i>             |                   |                   |
| <i>Tools</i>              |                   |                   |
| <i>Travel &amp; Local</i> |                   |                   |
| <i>Video Players</i>      |                   |                   |
| <i>Weather</i>            |                   |                   |
| <i>Includes FE?</i>       |                   |                   |
| <i>Number of FE</i>       |                   |                   |
| <i>Observations</i>       |                   |                   |
| <i>R-Squared</i>          |                   |                   |

*p*-values in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Each column reports the price coefficient corresponding to a given Play store category. Columns (1) and (2) report the linear demand price coefficient corresponding to the equation  $Q = a + bP$ . Column (2) uses the tax amount as the instrumental variable respectively. Coefficient estimates calculated using a single, fully-interacted regression model allowing coefficients to vary across the 33 Play Store categories. Fixed effects are unique to App name, App subproduct, purchase type (App sale, In-App purchase, subscription), customer state, App category, and year. *p*-values rounded to the third decimal place

**APPENDIX 4: TAX-RATE REGRESSIONS COLLAPSED NATIONWIDE**

|                            | (1)          | (2)          |
|----------------------------|--------------|--------------|
| <i>Dependent Variable:</i> | <i>ln(P)</i> | <i>ln(P)</i> |
| <i>Tax Rate</i>            |              |              |
|                            | (0)          | (0)          |
| <i>Constant</i>            |              |              |
|                            | (0)          | (0)          |
| <i>Includes FE?</i>        | Y            | Y            |
| <i>Number of FE</i>        |              |              |
| <i>Observations</i>        |              |              |
| <i>R-Squared</i>           |              |              |

*p*-values in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Tax rates expressed as percentages. Fixed effects in column (2) are unique to App name, App subproduct, purchase type (App sale, In-App purchase, subscription), and year. Fixed effects in column (1) are the same, except that they are not year-specific. Prices are calculated by dividing total consumer expenditure by the total units sold across all states and territories. I used the natural log of this weighted average price as the dependent variable. The tax rate is calculated by summing taxes paid across all states and territories, dividing it by the sum of consumer expenditure across all states and territories, and then multiplying this result by 100.

**APPENDIX 5: FLAWS IN GOOGLE EXPERTS' TAKE RATE BENCHMARKS**

256. In my Merits Report, I used standard economic models and empirical methods to estimate the take rate Google would have charged in a more competitive but-for world. I also presented a “non-comprehensive summary of take rates in comparable competitive digital platform environments,” which corroborates the but-for take rates from my economic models.<sup>585</sup>

257. The Google Experts offer various flawed benchmarks purporting to demonstrate that the Play Store’s 30 percent take rate is procompetitive.<sup>586</sup> The Google Experts’ benchmarks do not undermine my conclusions. *First*, they ignore that the take rates of other App stores may be influenced by Google’s own anticompetitive 30 percent take rate, as well as by the Apple App Store’s 30 percent take rate. This is one of the reasons I used standard economic models rather than benchmarks to estimate the but-for take rate.

258. *Second*, the Google Experts fail to demonstrate that their benchmarks are representative of competition, as opposed to market power. For example, it would not be surprising if Amazon’s take rates on the Twitch, Kindle eBook, Prime Direct Video, and Audible audiobook platforms reflected the exercise of substantial market power.<sup>587</sup>

259. *Third*, many of the Google Experts’ benchmarks reflect irrelevant or incomplete information. For example, Dr. Gentzkow lists the Amazon Appstore’s headline take rate of 30 percent in Exhibit 11 of his report, and suggests that only small developers (with revenue below \$1 million) would pay less, but fails to disclose that the Amazon Appstore’s effective take rate (net of discounts to developers) is only [REDACTED], or just [REDACTED] after netting out discounts to consumers.<sup>588</sup> This is the take rate that is listed in Table 7 of my Merits Report; it is confirmed by the court’s opinion in *Epic v. Apple*,<sup>589</sup> [REDACTED]  
[REDACTED]<sup>90</sup> The Google Experts list the Samsung Galaxy store’s headline rate of 30 percent, but cannot

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585. Singer Report ¶318; Table 7.

586. Leonard Report Exhibit 17; Gentzkow Report Exhibits 10-11; Tucker Report Table 10 & ¶460.

587. See, e.g., Jim Milliot, *Publishing Leaders Issuing Warning over Amazon’s Market Power* (Aug. 18, 2020), <https://www.publishersweekly.com/pw/by-topic/industry-news/bookselling/article/84119-publishing-leaders-issuing-warning-over-amazon-s-market-power.html>; IBISWorld, Audible Inc. – Company Profile, <https://www.ibisworld.com/us/company/audible-inc/428918/> (estimating that Audible accounts for “an estimated 63.4% of total industry revenue”); Stream Scheme, *Twitch Demographic & Growth Statistics [2022 Updated]*, <https://www.streamscheme.com/twitch-statistics/> (estimating that Amazon’s Twitch has 73% of live streaming market share); Statista, *Share of consumers renting/purchasing movies and TV shows from selected transactional video-on-demand (TVOD) services in the United States and Canada in 4<sup>th</sup> quarter 2021*, <https://www.statista.com/statistics/793037/popular-tvod-services-north-america/> (describing Amazon video as the “most popular transactional video-on-demand service in the United States and Canada as of the fourth quarter of 2021” with two-thirds of respondents stating they used the platform, compared to the second place YouTube Movies and Shows, which was used by 26% of respondents).

588. AMZ-GP\_00002471 (Morrill Exhibit 1363) ([REDACTED]).

589. See *Epic v. Apple*, 559 F. Supp. 3d 898, 997 (N.D. Cal. 2021) (“Apple relies on ‘headline’ rates that Dr. Evans and Dr. Schmalensee agree are frequently negotiated down. For example, the Amazon App Store has a headline rate of 30%, but its effective commission is only 18.1%.”).

590. AMZ-GP\_00002471 (Morrill Exhibit 1363).

confirm that this was the effective take rate actually paid by all (or almost all) developers.<sup>591</sup> Moreover, the Challenged Conduct has discouraged Samsung from effectively competing with the Play Store.<sup>592</sup>

260. The Google Experts list production and publishing platforms such as Amazon's Kindle Direct Publishing. This platform performs much more than distribution; it offers a range of services to authors, allowing them to design, format, and publish eBooks, paperback books, and hardcover books.<sup>593</sup> These services extend after publication of a book, including a system for Amazon and eBook purchasers to notify the author of quality issues, and to allow the author to correct images, typos, and formatting issues directly in the publishing platform before republishing.<sup>594</sup>

261. In Table 7 of my Merits Report, I listed take rates for Aptoide ranging from ten percent to 25 percent. Dr. Gentzkow claims that the lower end of this range is "misleading" because the ten percent take rate applies only if the user downloads the App using the developer's link.<sup>595</sup> In fact, my Merits Report explained clearly that the lower take rate applies "if the user downloads the App using the developer's own URL."<sup>596</sup> The ten percent take rate is relevant precisely because, unlike the Play Store, Aptoide's published take rate structure lends itself to steering.<sup>597</sup> When introducing Aptoide as a benchmark, I reiterated that the ten percent take rate applies only "in some cases."<sup>598</sup>

262. The Google Experts' benchmarks also include take rates for Chinese App stores. As explained in Part I.D above, the Google Experts do not acknowledge the limits of intellectual property protection and the widespread practice of app scraping in the Chinese ecosystem, which together limit app developers' ability to command more favorable take rates. They also ignore the considerable regulatory burdens and the associated costs for Chinese Apps stores.

263. The Google Experts also list take rates associated with game stores on various gaming consoles, such as Nintendo (Nintendo E-Shop), Xbox (Microsoft Store), and PlayStation (PlayStation Store). Unlike the Play Store, the revenue earned by these platforms from games purchased for their consoles is used to cover the costs of production and distribution of the game

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591. [REDACTED]

See, e.g., SEA\_EPICPRODUCTION\_002243 -2437.

592. Singer Merits Report Part IV.2.c.

593. See Kindle Direct Publishing, "Create a Book," [https://kdp.amazon.com/en\\_US/help/topic/G202172740](https://kdp.amazon.com/en_US/help/topic/G202172740).

594. See Kindle Direct Publishing, "Quality Notifications Dashboard," [https://kdp.amazon.com/en\\_US/help/topic/GWCUU33VBJHFSRYN](https://kdp.amazon.com/en_US/help/topic/GWCUU33VBJHFSRYN)

595. Gentzkow Report ¶170.

596. Singer Merits Report ¶253 ("In contrast, other App stores allow developers the ability to select their providers of payment systems for purchases of In-App Content at lower take rates than Google imposes. For example, Aptoide imposes a ten percent take rate for purchases of In-App Content *if the user downloads the App using the developer's own URL.*") (emphasis added).

597. Singer Merits Report ¶¶252-253.

598. *Id.* ¶311 ("Aptoide, another App store operating worldwide, assesses a maximum take rate of 25 percent and *in some cases* charges a take rate as low as ten percent.") (emphasis added).

console hardware.<sup>599</sup> In other words, gaming consoles operate under a fundamentally different business model when compared to App stores.

264. The Google Experts also list the Steam PC Store as a benchmark. But as Dr. Gentzkow acknowledges, the take rate drops to [REDACTED] for games with annual revenue above [REDACTED], and to [REDACTED] for those with annual revenue above [REDACTED]. Moreover, record evidence indicates [REDACTED]

[REDACTED]<sup>600</sup> This indicates that [REDACTED]. Table A9 below summarizes the flaws and limitations in the various benchmarks offered by the Google Experts.

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599. For example, record evidence indicates that Microsoft loses money on the sale of Xbox consoles, while earning a profit from sales of Xbox games. *See* Sean Keane, “Xbox consoles have never turned a profit for Microsoft,” CNET (May 7, 2021), <https://www.cnet.com/tech/gaming/xbox-consoles-have-never-turned-a-profit-for-microsoft/>. Sony also sells its PlayStation 5 consoles at a loss. *See* Steve Dent, “Sony drops PlayStation 5 sales forecast again due to chip shortage,” Engadget (Feb. 2, 2022), <https://www.engadget.com/sony-ps5-forecast-down-chip-shortages-085523096.html>.

600. *See* Barry Elad, “25+ Steam Statistics 2022 Users, Most Played Games, Market Share and Demographics,” Enterprise Apps Today (Aug. 15, 2022), <https://www.enterpriseappstoday.com/stats/steam-statistics.html>.



APPENDIX TABLE A9: FLAWS/LIMITATIONS IN GOOGLE EXPERTS' BENCHMARKS

| Expert(s)                 | Proposed Benchmark                  | Flaw(s) & Limitation(s)   |
|---------------------------|-------------------------------------|---|
| Leonard, Gentzkow, Tucker | Amazon App Store                    | Amazon Appstore effective take rate is 18% (or 22% excluding consumer discounts).   |
| Leonard, Gentzkow, Tucker | Samsung Galaxy Store                | Challenged Conduct discouraged Samsung from competing effectively. Google Experts cannot confirm that 30% is effective take rate actually paid by developers. |
| Leonard, Gentzkow, Tucker | PlayStation Store                   | Console business model not comparable; revenues support production/distribution of consoles.  |
| Leonard, Gentzkow, Tucker | Nintendo E-Shop/Nintendo Game Store | <i>Id.</i>  |
| Leonard, Gentzkow, Tucker | Steam/Valve                         | Steam revenue [REDACTED] no evidence that Steam lacks market power.   |
| Leonard, Gentzkow, Tucker | Kindle Direct Publishing            | No evidence Amazon lacks market power. Publishing not comparable; performs much more than distribution.   |
| Gentzkow, Tucker          | Apple App Store                     | Apple has substantial market power.   |
| Gentzkow, Tucker          | Microsoft Store                     | Microsoft's Xbox console business model not comparable; revenues support production/distribution of consoles.   |
| Gentzkow, Tucker          | Epic Games Store                    | Epic take rate is only 12%.   |
| Gentzkow, Tucker          | Amazon Prime Video Direct           | No evidence Amazon lacks market power. Video distribution is a distinct market.   |
| Leonard                   | Audible-ACX                         | No evidence Amazon lacks market power in audiobooks; performs much more than audiobook distribution.  |
| Gentzkow                  | Aptoide                             | Lower-end (10%) take rate when consumer downloads via developer URL, allowing for developer steering.   |
| Gentzkow                  | ONE Store                           | Take rate only 20%.   |
| Gentzkow                  | Xiaomi GetApps                      | Google Experts ignore effects of app scraping, lack of IP protection, and regulatory burdens on Chinese App stores; outside relevant geographic market.       |
| Gentzkow                  | TenCent MyApp                       | <i>Id.</i>  |
| Gentzkow                  | Oppo Software Store                 | <i>Id.</i>  |
| Gentzkow                  | Vivo App Store                      | <i>Id.</i>  |
| Gentzkow                  | Huawei AppGallery                   | <i>Id.</i>  |
| Gentzkow                  | Audible                             | No evidence Amazon lacks market power in audiobooks.  |
| Gentzkow                  | Kobo                                | No evidence e-book or audiobook publishing is comparable.   |
| Gentzkow                  | Nook                                | No evidence e-book publishing is comparable, or that Barnes & Noble lacks market power.   |
| Gentzkow                  | Roku                                | Take rate on paid apps and app subscriptions only 20%.  |
| Gentzkow                  | Twitch                              | No evidence Amazon lacks market power. Video live streaming is a distinct market.   |
| Tucker                    | Shutterstock                        | No evidence Shutterstock lacks market power. Media licensing is a distinct market.  |
| Tucker                    | Amazon Music                        | No evidence Amazon lacks market power. Music distribution is a distinct market.   |
| Tucker                    | Apple iTunes                        | No evidence Apple lacks market power. Music distribution is a distinct market.  |